MEMOIR 92 JULY, 1925

CORNELL UNIVERSITY
AGRICULTURAL EXPERIMENT STATION

THE FLORA OF THE CAYUGA LAKE BASIN, NEW YORK

VASCULAR PLANTS

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No. 11253

ITHACA, NEW YORK
PUBLISHED BY THE UNIVERSITY
Received for publication March 6, 1924
Date of issue, May, 1926

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It is therefore as a contribution both to pure science and to agriculture that the present work has been undertaken.

In plan, the treatment herewith presented shows some marked departures from that of Dudley's *Flora*. This catalog is intended to include all vascular plants growing spontaneously within the limits of the drainage basin of Cayuga Lake and its tributary streams, while Dudley's *Flora* covered only the Spermatophyta. A more important difference, however, is the introduction of keys, which should add greatly to the usefulness of the work, and which at the same time afford a concise means of recording much new information acquired during the study of the large amount of material collected in recent years. A considerable effort has been made to verify these keys, and it is hoped that they are reasonably correct. Also, the new *Flora* differs widely from the old one in the system of classification followed. The original *Flora* was arranged on the Benthamian system, whereas the system here employed is that of Eichler-Engler, now used very generally throughout the world. By adopting this system the authors do not wish to imply an unquestioned acceptance of it as representing the most modern conception of plant relationship; but until some other more modern system has been generally accepted, it would not be practicable, in a flora of this scope, to modify that now in vogue. The writers have given themselves some freedom in the interpretation of family limits and in the arrangement and sequence of genera, and still more freedom in dealing with species and varieties.

Another marked departure from the old *Flora* is in the nomenclature employed. The names used by Dudley were, with few exceptions, those found in current manuals. In the present work the International Code (Vienna Code) is consistently followed. Nomenclatorial changes due to this and other causes will give an impression of strangeness to one familiar with the Dudley *Flora*.

In the matter of specific, generic, and family limits a conservative attitude has been adopted, and departures from widely accepted procedure have been made only after extended study has shown that the old position is no longer tenable. In the main, comprehensive groups have been favored, especially when they can be more clearly defined or when such groups are more nearly coordinate with other related groups than the segregates would be; and also the belief is held that the indication of relationship shown by the use of comprehensive generic names must be given some consideration. Though there may be a difference of opinion in this regard, it would seem that, for beginners, larger and fewer groups, with fewer generic and family names, are less confusing and less difficult to master than smaller, more homogeneous though not structurally distinct, segregates. An attempt has been made to give consideration in each case to the arguments usually applied by those holding different points of view.

In this work, varieties and forms as categories in rank below the

species are retained. Accurate scientific taxonomy would seem to require some such means of indicating and classifying lack of uniformity within the species. Differences between plants are of different grades, and without this finer means of expression the comparative value of the differences must often be misrepresented. Species are distinct from one another. Varieties run together. The term *variety* as here employed usually indicates the extreme of a more or less continuous series, either local or geographical. The distinction is not usually employed, however, unless there is a sufficient break in the series at some point to render the separation of the variety of practical value. Generally the variety is characterized by the extreme of only one or two characters. *Form* is comparable to the old terms *sport* and *freak*, and represents an incidental condition which may appear independently wherever the species is found. Following the general English and American practice, the variety of a polymorphic species on which that species was established is not separated as var. *typica*, but is treated as the species itself or as the typical form of the species, without further designation.

Many forms occur in the flora which give the appearance of being natural hybrids. If this seems the most rational explanation when all evidence is considered, they are so treated in the text. In such cases it must be remembered that their hybrid origin is not proved, but rests on circumstantial evidence. Hybrids are not given nomenclatorial status in this work, except occasionally when there is a citation of their supposed parents connected by the sign ×. If they are given definite names, their status in taxonomy is unduly emphasized and they are likely to be confused in standing with the real species from which they have been derived.

In the catalog part of the text, the statements regarding habitat and frequency, and the lists of stations, have been formulated to express the views of the authors based on their experience. The dates of flowering are taken from Dudley's *Flora*, but they have been checked by recent collections and observations, and modified when the experience of the authors would indicate them to be incorrect. The ranges are added for the convenience of students of plant geography, as well as to give every student some idea of where the plant is found. These ranges are taken freely from current manuals, but they have frequently been emended when further knowledge of the plant has made this necessary. It is not claimed, however, that they are more than reasonably accurate.

Perhaps the part of this text most liable to error is that dealing with the soil preferences and with occurrence on the Coastal Plain. Actual scientific knowledge of the soil requirements of individual species is as yet very meager, and only impressions from general experience could be drawn upon for the statements given. A beginning in soil study is so important, however, that it was thought best to record what is locally, though imperfectly, known. In order to throw light on soil requirements,

it seemed desirable to add information as to the occurrence of each species on the Coastal Plain. This region is one of the most distinct, and also one of the most interesting, of the geographical regions of eastern North America, and is characterized not only to some extent by its climate, but more particularly by peculiarities of soil. The authors found it necessary, however, to compile the information concerning occurrence of plants on the Coastal Plain from fragmentary records in catalogs and from personal notes, and thus there is opportunity for error.

No new names are proposed in this work. All new names required have already been published in journals.

In the work of preparing this flora, kindly aid has been extended by many persons. To all of these, gratitude is expressed. Particularly are to be mentioned Mrs. Mabel White Allen and Mr. Stewart Burnham, who tested the keys and otherwise aided in editorial work on the manuscript. Much credit is due to the Editorial Office of the College for the manner in which the work is issued.

LOCATION AND LIMITS OF THE FLORA

Cayuga Lake is located in the Finger Lakes Region of New York, on

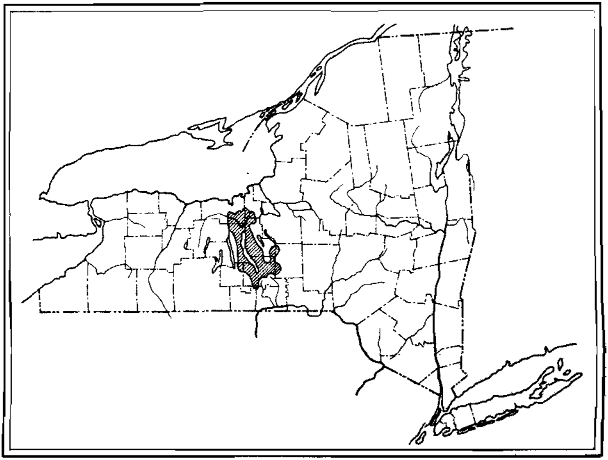

FIGURE 1. LOCATION OF THE CAYUGA LAKE BASIN IN NEW YORK

the southern border of the drainage basin of Lake Ontario and the St. Lawrence River. The region thus has a general slope toward the north. Cayuga Lake lies near the geographical center of the State, and is about centrally located in the lake region of which it forms a part. In this position it extends in a north-and-south direction. The lake is one of the two largest in the series, and is 61.3 kilometers (38.1 miles) long. Its maximum breadth is 5.6 kilometers (3.5 miles), though through most of its length it is only about 2.4 kilometers (1.5 miles) wide. Like the other finger lakes, it is thus extremely long and narrow, and it has characteristically straight shores and is almost free from islands. In altitude it is the lowest of these lakes, its height above sea level being 115 meters (380 feet).

The drainage basin of Cayuga Lake as herein limited at the outlet end extends from the village of Westbury on the north to North Spencer on the south, and has a maximum length of about 114.5 kilometers (71 miles). At the northern end the basin is comparatively narrow, being only about 19.3 kilometers (12 miles) wide at Cayuga; but southward the width increases until near the southern end of the lake it is about 51.4 kilometers (32 miles). This widest part extends from near Cayuta Lake on the west to the Cortland marl ponds on the east. The drainage area lies in the counties of Cayuga, Cortland, Tompkins, Tioga, Schuyler, Seneca, and Wayne. Tompkins County is almost wholly contained within its limits, but only small parts of the counties of Cortland, Tioga, Schuyler, and Wayne fall within the basin. The southern border of the basin is on the watershed between the St. Lawrence and Susquehanna River systems.

At the northern end, where the lake basin fades into the great Ontario plain, an arbitrary limit has been established. Again, as in Dudley's *Flora*, the somewhat independent region of the West Junius ponds is included, and several miles of territory to the north of Montezuma are also added in order that the *Flora* may cover all of the region between Cayuga Lake and the immediate drainage area of the Lake Ontario shore. The present work is planned to include all vascular plants growing spontaneously within the limits outlined above, and also those of the watershed marshes and ponds.

EXPLANATION OF THE CATALOG

While the catalog in general is self-explanatory, a few details may need further explanation. Specific and varietal names, when heading the treatment of that species or variety, are printed in bold-faced type if the plant is native about Ithaca or in this general part of the country. If the plant is an immigrant from some other country or from a distant part of this country, light-faced small capitals are used. Such plants, when first entering the region and not yet established, are said to be *adventive*; when brought in by man in other than accidental ways, they are *intro-*

duced; when fully established, they are *naturalized*. Only native plants or those so fully established as to maintain themselves from year to year are given a full numbered place in the catalog. Those not yet established are listed in brackets, or a few in footnotes only. Varieties are indicated by the abbreviation *var.*, and forms by the word *forma*. Common names are given when such are known to be frequently applied to the plant. Synonyms are given only when their omission would lead to confusion. In general, they are included only when the name used differs from that employed in Gray's *Manual of Botany* (seventh edition). A reference is added, in such cases, to a place where the status of the name is fully discussed. An attempt has been made to correlate the nomenclature used with that found in Dudley's *Flora*.

Plants are listed as to frequency under the following terms, in sequence as to abundance: *rare, scarce, infrequent, frequent, common*. A plant having five known stations or less is considered rare unless it is so abundant at some of the stations as to violate the idea of rareness. Collectors, except when these are the authors, are cited for rare plants. Stations are not cited for plants that are common. The symbol (*D.*) indicates that this station was listed in Dudley's *Flora*, and (!) indicates that the plant has been seen by the present authors at the same station. The dates given in the first paragraph under each species refer to the time of flowering unless specifically indicated to represent the fruiting period.

Only species and varieties are included in the keys, forms being omitted. Occasionally at the end of a paragraph in a key, additional material is given in parenthesis. This is for information only, and is not intended to contrast with a similar statement in the corresponding division of the key.

MAPS

Two maps are provided. One is merely an outline map of New York showing the location of the Cayuga Lake Basin. The other is a detailed map of the basin, on which are located the important political features of the region together with most of the swamps, ponds, and streams that are of importance to the collector and are cited in the text. Four levels of altitude are indicated on the map, in an attempt to represent the Ontario plain, the lower plateau, the upper plateau, and the highest hills. After a study of the escarpments between these regions, the altitude chosen to limit the lowest level was 275 meters (900 feet). The second level then fell between 275 and 427 meters (900 and 1400 feet), the higher level between 427 and 550 meters (1400 and 1800 feet), and the highest hills between 550 and 640 meters (1800 and 2095 feet). The map was checked with the United States topographical maps for accuracy of detail in placing towns, railroads, swamps, ponds, streams, and other features, and the topography was worked on to the map from the topographical maps.

While the towns and other gross features can be readily located on the map, difficulty may be encountered in locating many of the collecting regions. The following index is intended to aid in the location of places less well-known which are cited in the text. By the index number given, their approximate location may be determined.

Amphitheater, Six Mile Creek.—South side of creek at lower reservoir. I 20½.
Bald Hill, Caroline.— K 23. Dudley's "Bald Hill" seems to have been northwest of this hill.
Bald Hill, Ithaca = Eagle Hill.
Ball Hill, Danby.— H½ 23.
Bates Woods.— Near Glenwood. G¾ 19½.
Bear Swamp = Woodwardia Bog. Dudley's "Bear Swamp" was north of Benson Corners.
Beaver Brook.— L½ 18.
Beebe Lake.—Fall Creek Gorge below Forest Home.
Beech Woods, Six Mile Creek.— Below lower reservoir.
Benson Corners.— J 18.
Besemer.—J 21½.
Big Gully.— F 12.
Black Brook, Tyre.— C 8.
Black Creek.—C 5.
Black Lake.— D 8½.
Botrychium Woods, Spring Lake.—Northwest of Spring Lake village. F 4.
Brookton Springs.—J½ 22.
Bull Hill, Newfield.— F½ 23.
Burdick Glen = Esty Glen.
Burt Schoolhouse = Fleming Schoolhouse.
Bushy Point, Cayuga Lake.—Mentioned by Dudley, but location not now known.
Buttermilk Glen.—H 21.
Canoga Marshes.— D 11.
Caroline Pinnacles.— K 23.
Cascade Pond = Dwyer Pond.
Cascadilla Glen.— I 20½.
Cayuga Bridge.— Long railroad bridge at Cayuga.
Cayuga Heights.— North of Cornell Heights and just outside limits of city of Ithaca. H½ 20.
Cayuga Lake Park.— Opposite Cayuga. D 9½.
Cayuga Marshes.— Southern part of Montezuma Marshes.
Cayuta Lake.— D½ 22.
Cayutaville.— E 22.
Chicago Bog.— M 18.
Chicago Crossing = Gracie Station.
Chicago Springs.—One mile south of Gracie Station, and west of road.
Chickaree Woods.— East of Agricultural College barns, formerly.
Circus common, south of Percy Field.—Between Falls Street and Fall Creek, formerly.
Connecticut Hill.— F 22.
Cortland marl ponds.— M½ 17½.
Coy Glen.— H 21.
Crane Creek.— F 7.
Crowbar Point.— G½ 19.
Crusoe Bog, Lake, and Prairie.— D 5.
Dart Woods.— On hill south of Ellis Hollow Swamp.
Dryden-Lansing Swamp.—I½ 19.

Duck Lake.— F 4.
Dwyer Pond.— Cascadilla Creek just above South Avenue.
Eagle Hill.— I½ 20¼.
East Lawn Cemetery.— I 20½.
Eddy Pond.—Now Girls' Playground, Cascadilla Glen.
Ellis Hollow Swamp.— J½ 20½.
Elm Beach, Romulus.— D 14½.
Enfield Glen.—G 21½.
Esty Glen.— I 19.
Factory Street = Stewart Avenue, Ithaca.
Fall Creek Gorge.— I 20.
Farley Point.—E 11½.
Featherbed Bog.— F 3½.
Ferris Brook.— At Ferris Place, Ithaca.
Fir Tree Swamp between Slaterville and Dryden.— L 20½.
Fir Tree Swamp, Danby.— I 22.
Fir Tree Swamp, Freeville.— K½ 18½.
Fiske-McGraw *grounds = Chi Psi grounds, near Morse Hall.*
Fleming Meadow.—Inlet Valley, near Buttermilk Falls but west of railroad. G¾ 21.
Fleming Schoolhouse.— Inlet Valley near Buttermilk Falls.
Fox Ridge.— E½ 6.
Franklin Ravine.— About two miles north of King Ferry.
Free Hollow = Forest Home.
Freeville Bog.— K 18½.
Frontenac Island.— E 11.
Frontenac Point.— F½ 18.
Geer Gulf = Coy Glen.
Girls' Playground, Cascadilla Glen.—Along South Avenue, south of athletic fields.
Glass Works.— Junction of Cascadilla Creek and the Inlet, formerly.
Glen Pond.—Cascadilla Glen at Stewart Avenue.
Goodwin Point = Taughannock Point.
Gracie Station.— M 17½.
Gracie Swamp = McLean swamp along Beaver Brook.
Green Tree Falls = Potter Falls.
Grotto.— J 17¾.
Hanshaw Corners.— I 20.
Hardenburg Gulf.—Between Coy Glen and Enfield Glen.
Headwaters Swamp.— H½ 24½.
Hibiscus Point.— E 11.
Hill Branch = Stream south of Sawyer Creek. E½ 11.
Howland Island.— F 5.
Howland Point.— E.
Incline, South Hill.—Near junction of Cayuga Street and railroad.
Indian Salt Spring.— South of Black Lake.
Indian Spring.— Lake Street, Ithaca, one-half mile south of Renwick.
Inlet Marshes.— Cayuga Inlet between Ithaca and the lake. "Ithaca Marshes," in part.
Isoëtes Pond.—Westernmost and smallest of Cortland marl ponds, northeast of Chicago Bog.
Ithaca Falls.—At lower end of Fall Creek Gorge.
Jennings Pond.— I 23.
Judd Falls.— Near East Ithaca, at railway bridge over Cascadilla Creek.
Kennedy Corners.— G 20.
Key Hill.— F½ 22½.
Kidders Ferry = Kidders. E 16.

King Ferry.— F 15½.
Krum Corners.— G 19¾.
Lake Como.— L 15.
Larch Meadow.— H 21.
Lay Iron Spring.— Just west of Black Lake.
Lick Brook.— H 22.
Locke Pond = Lake Como.
Lockwood Flats.— At mouth of Big Gully.
Long Point.— E 14.
Lowery Ponds.— A 8½.
Lucifer Falls.— High falls in Enfield Glen.
McGowan Woods.—I½ 20¼.
McKinney Twin Glens.— At McKinneys.
McLean Bogs.— M 18.
Malloryville Bog.— L 18.
Marl Creek Meadows.—M½ 17½, by large marl pond.
May Point.— E 8.
Michigan Hollow Swamp.— I 23.
Midway.— I 18.
Miller Bog, Spring Lake.—One-eighth mile west of Spring Lake village.
Montezuma Marshes.— E 7.
Moore Creek.— H 18.
Mud Creek, Freeville.— L 18½.
Mud Pond, *Conquest.— F 4.*
Mud Pond, Ira.— G½ 3.
Mud Pond, McLean Bogs.— M 18.
Narrows, Six Mile Creek.— Below dam at lower reservoir.
Neguaena Creek = Cayuga Inlet.
Negundo Woods.—Cayuga Inlet at upper D., L. & W. R. R. bridge.
Newfield Swamp.—Southwest of Key Hill.
Newton Ponds.— A 8¼.
Nook.— Lake Street, Ithaca, at first cove north of Fall Creek.
Osmun.— Near Midway, formerly. I 18.
Otter Lake.— H½ 4.
Otter Spring.— M¾ 16¾.
Outlet Marshes = Montezuma Marshes.
Paine Creek.— F 14.
Phillips Pond.— A 8½.
Pleasant Grove Brook.— 150 yards south of Renwick.
Pleasant Grove Cemetery.— At head of Pleasant Grove Brook.
Pony Hollow.— F 24.
Portland Point.— H 19.
Potter Falls.— I¼ 21.
Pout Pond.— A 9.
President White Place = President's house, Cornell University campus.
Pumping station, Ithaca water works.—At Van Natta Dam.
Red Mills and Red Mill Pond.— L 18½.
Renwick Park = Stewart Park.
Rhodes Woods.— On hill south of Etna.
Ringwood.— K 20.
Roger Corner.— L 16.
Round Marshes = McLean Bogs.
Salmon Creek.— H 17.
Salt Creek.—North of Montezuma village.
Salt Pond west of Howland Island.— E 5½.

Salt springs.—*East of Montezuma village; along Salt Creek; south of Black Lake;* Cayuga Lake shore, opposite Cayuga.
Saxon Hill = Connecticut Hill.
Shurger Glen.—I 18½.
Signer Woods.—H¾ 24½.
Slaterville Swamp.—L 22.
Slayton Pond.—G 5.
Snyder Hill.—J 21.
South Hill Marsh.—*H½ 21¾.*
Spencer Lake.—H½ 25.
Spring Lake.—F 4½.
Spruce Swamp, *Enfield.*—F½ 21.
Stark Pond.—G½ 5.
Stevens Woods.—Along railroad, Ithaca, near southwest corner of Cayuga Lake. G¾ 20.
Stewart Park.—South end of Cayuga Lake, east of lighthouses.
Sulphur Spring, Six Mile Creek.—East side of creek, at first cove above Van Natta Dam.
Summer Hill.—L 16.
Summit Marsh.—H½ 25.
Taft *Hill = Bald Hill, Caroline.*
Taughannock Gorge.—*F½ 18½.*
Thatcher *Pinnacles.*—*H½ 23½.*
Townley Swamp.—J *18.*
Triphammer Falls.—Fall Creek, just below Beebe Lake.
Turkey Hill.—J 20.
Turtle Pond.—In Tamarack Swamp. D 4½.
Utt Point.—South of Farley Point and north of Big Gully Point.
Valentine Brook.—Small brook near Valentine Place, Ithaca.
Valley Cemetery.—Inlet Valley, southwest of Buttermilk Falls.
Vandemark Pond.—A 8¼.
Van Natta Dam.—At junction of Six Mile Creek and Giles Street.
Warren woodlot.—North of Fall Creek and one-half mile east of Forest Home.
Waterburg.—E½ 19.
Wells Falls.—Just below Van Natta Dam.
Westbury Bog and Prairie.—E 2½.
White Church.—K 23.
Willets.—E 14½.
Willow Glen.—K 19½.
Willow Point.—*South of McKinneys.*
Willow Pond.—Just east of Cascadilla Hall, Ithaca, formerly.
Wood Mill.— H 13.
Woodwardia Bog.—L 18¾.
Wyckoff Swamp.—J 17½.

ARTIFICIAL KEY TO THE FAMILIES OF VASCULAR PLANTS

PAGE

a. Reproduction by spores in sporangia on the under side of the leaves, in the leaf axils, in cone-like spikes, or on short basal branches. (Pteridophyta).
  b. Leaves (fronds) broad, flat, and fern-like, more or less pinnately or ternately divided or entire.
    c. Sporangia with an annulus, splitting open by a transverse cleft on one side, the walls 1 cell thick; fronds similar or dimorphic. . POLYPODIACEAE 26
    c. Sporangia without an annulus, splitting open by a vertical slit; fronds dimorphic or at least the fertile and sterile divisions very dissimilar.
      d. Sporangia on special modified fronds or on much modified divisions at the summit or middle of the sterile frond; walls of the sporangia 1 cell thick; rootstocks stout; fronds in large clumps. . OSMUNDACEAE 33
      d. Sporangia aggregated in spikes or panicles apparently at the summit of the stem, with the leaf-like sterile part lateral or basal; walls of the sporangia several cells thick; rootstocks practically wanting; fronds not in clumps. . . . . OPHIOGLOSSACEAE 35
  b. Leaves narrow, small, and scale-like, or larger, divided, and clover-like (see also 3d *b*).
    c. Leaves 4-foliolate, clover-like. . . . . MARSILEACEAE 34
    c. Leaves subulate, scale-like.
      d. Leaves whorled, forming sheaths at the nodes of the jointed stem; sporangia in terminal spikes. . . . . EQUISETACEAE 36
      d. Leaves not whorled; stems not conspicuously jointed.
        e. Plants aquatic, floating, small, branched, and coral-like. . SALVINIACEAE 34
        e. Plants not aquatic.
          f. Plants not resembling mosses, the stems often long and creeping; spores all alike. . . . . LYCOPODIACEAE 38
          f. Plants small and moss-like; spores of two kinds (microspores and megaspores) . . . . SELAGINELLACEAE 40
  b. Leaves long and quill-like, all basal. . . . . ISOETACEAE 40
a. Reproduction by seeds each containing an embryo (Spermatophyta).
  b. Ovules and seeds exposed on open bracts; trees and shrubs, with needle-like or scale-like, mostly evergreen, leaves (Gymnospermae).
    c. Seeds borne in cones or in a several-seeded berry. . . . . PINACEAE 41
    c. Seeds solitary, loosely invested by a pulpy cup. . . . . TAXACEAE 41
  b. Ovules and seeds in a closed ovary; herbs or woody plants, with broad or narrow, evergreen or deciduous, leaves (Angiospermae).
    c. Plants scarcely differentiated into stem and leaf; floating aquatics. LEMNACEAE 135
    c. Plants ordinary, leafy.
      d. Ovary inferior. (2d *d*, p. 17.)
        e. Herbs, rarely slightly woody at base. (2d *e*, p. 17.)
          f. Leaves opposite or verticillate. (2d *f*, p. 16.)
            g. Flowers in umbels. . . . . ARALIACEAE 319
            g. Flowers in involucrate heads (see also 3d *g*).
              h. Stamens syngenesious . . . . COMPOSITAE 394
              h. Stamens separate or but slightly united.
                i. Heads greenish or yellowish, unisexual. . . . . *Ambrosia* 413 and *Xanthium* 414
                i. Heads white, purple, or blue; flowers perfect. . . DIPSACACEAE 391
            g. Flowers neither in umbels nor in involucrate heads.
              h. Corolla gamopetalous; limb of calyx often minute.
                i. Leaves opposite without stipules, or if stipulate the corolla rotate or saucer-shaped.

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j. Stamens as many as the lobes of the corolla. CAPRIFOLIACEAE 384
j. Stamens fewer than the lobes of the corolla. VALERIANACEAE 390
i. Leaves opposite with stipules, or whorled and without stipules. RUBIACEAE 380
h. Corolla wanting, or not markedly differing from the calyx, or of separate petals.
i. Plants parasitic on the branches of trees, nearly leafless and not green .... LORANTHACEAE 184
i. Plants not parasitic, green.
j. Plants floating aquatics; rarely emersed when water dries out; leaves whorled.
k. Leaves pinnatifid or almost wanting...... *Myriophyllum* 318
k. Leaves linear or oblong.
l. Perianth 3- or 6-parted; leaves in whorls of 3... *Elodea* 55
l. Perianth entire; leaves in whorls of more than 5. *Hippuris* 318
j. Plants not floating aquatics.
k. Flowers regular; stamens not fused with style.
l. Ovary 1–4-celled; stamens 2–8; petals 0–4. ONAGRACEAE 313
l. Ovary 1-celled; stamens 10; petals 0.. *Chrysosplenium* 238
k. Flowers irregular; stamens fused with style..... *Listera* 159
f. Leaves alternate or basal.
g. Flowers in simple, compound, or paniculate umbels; leaves usually compound.
h. Fruit dry, splitting into two parts; ovary 2-celled; styles 2. UMBELLIFERAE 320
h. Fruit fleshy; ovary 5-celled; styles 5................... *Aralia* 319
g. Flowers in involucrate heads (see also 3d *g*)........ COMPOSITAE 394
g. Flowers neither in umbels nor in involucrate heads (or rarely in simple umbels and the leaves simple).
h. Corolla gamopetalous.
i. Plants twining or climbing, usually with tendrils. CUCURBITACEAE 392
i. Plants neither twining nor climbing.
j. Corolla regular; anthers separate....... CAMPANULACEAE 392
j. Corolla irregular; anthers syngenesious....... LOBELIACEAE 393
h. Corolla polypetalous, wanting, or not markedly differing from the calyx.
i. Leaves parallel-veined, entire; monocotyledons.
j. Plants aquatic; flowers inconspicuous, greenish, unisexual; (stamens 3–12; ovary 1-celled).............. *Vallisneria* 55
j. Plants terrestrial; flowers often showy, perfect.
k. Flowers irregular; stamens 1–2, fused with the style; ovary 1-celled .... ORCHIDACEAE 151
k. Flowers regular; ovary 3-celled.
l. Stamens 6 .... AMARYLLIDACEAE 150
l. Stamens 3 .... IRIDACEAE 150
i. Leaves netted-veined, pinnatifid.
j. Ovary 1-celled.
k. Flowers borne on a fleshy spike inclosed in a spathe. *Symplocarpus* 135
k. Flowers cymose; spathe wanting......... SANTALACEAE 184

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j. Ovary 2–4-celled (see also 3d *i*).
k. Styles or sessile stigmas 3 or 4; petals inconspicuous or wanting; aquatic or marsh plants, often with pinnatifid leaves ............................HALORAGIDACEAE 318
k. Style 1, bearing 1–4 stigmas; petals often showy; marsh or upland plants........................ONAGRACEAE 313
j. Ovary 6-celled; petals mostly wanting..ARISTOLOCHIACEAE 185
e. Woody plants.
f. Staminate flowers in catkins, or in short, globular, drooping spikes (see also Nyssa and Urticaceae).
g. Leaves pinnate ..............................JUGLANDACEAE 172
g. Leaves simple.
h. Stigmas or styles 2; ovary 1–2-celled............BETULACEAE 174
h. Stigmas or styles 3; ovary 3–7-celled...............FAGACEAE 177
f. Flowers not in catkins nor in globular drooping spikes.
g. Leaves opposite or whorled.
h. Leaves stipulate or whorled......................RUBIACEAE 380
h. Leaves opposite without stipules, or if stipulate the corollas rotate or saucer-shaped.
i. Petals 4–5, united.......................CAPRIFOLIACEAE 384
i. Petals 4, separate.................................*Cornus* 327
g. Leaves alternate.
h. Flowers umbellate, minute, greenish..............ARALIACEAE 319
h. Flowers not umbellate.
i. Flowers perigynous.
j. Flowers in late autumn.................HAMAMELIDACEAE 241
j. Flowers in spring or summer.
k. Petals not longer than the sepals; stamens 4–5....*Ribes* 239
k. Petals longer than the sepals; stamens 5–many.
ROSACEAE 241
i. Flowers epigynous.
j. Ovary 1–2-celled; polypetalous or apetalous; stamens 4–15.
CORNACEAE 327
j. Ovary 4–5- or 10-celled; polypetalous or gamopetalous; stamens 8–10 ....ERICACEAE 329
d. Ovary superior, except sometimes at base.
e. Corolla wanting or not markedly differing from the calyx. (2d *e*, p. 19.)
f. Plants grass-like, with very small green or brown flowers; perianth when present rigid; bracts rigid.
g. Perianth present, 6-parted.........................JUNCACEAE 137
g. Perianth wanting, or of bristles or irregular scales.
h. Leaves in ½ phyllotaxy, usually with open sheaths; culms terete or flattened, usually hollow..............GRAMINEAE 55
h. Leaves mostly in ⅓ phyllotaxy, with closed sheaths; culms terete or 3-angled, solid.......................CYPERACEAE 92
f. Plants not grass-like, or if so with petaloid soft perianth.
g. Plants aquatic, rooting or floating, only the flowers sometimes raised above the surface; rarely emersed in the mud when the water dries out.
h. Submerged leaves entire or denticulate.
i. Flowers yellow ....*Heteranthera* 137
i. Flowers not pure yellow.
j. Flowers in dense racemose monoecious heads.
SPARGANIACEAE 44

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j. Flowers not in heads, or if so then perfect.
k. Flowers axillary, solitary, with a 2-lobed truncate or retuse ovary .... CALLITRICHACEAE 290
k. Flowers spicate, or if axillary then the ovary not as above .... NAJADACEAE 46
h. Submerged leaves palmately or dichotomously dissected. CERATOPHYLLACEAE 205
g. Plants not truly aquatic, part of the stem or leaves raised above the surface of the water.
h. Herbs. (2d *h*, p. 19.)
i. Flowers in dense fleshy greenish spikes (spadix) which are usually subtended by a spathe; perianth present or absent. ARACEAE 134
i. Flowers in dense unisexual spikes, each minute floret subtended by bristles........................ TYPHACEAE 44
i. Flowers in long slender white nodding spikes; perianth wanting .... PIPERACEAE 161
i. Flowers not in spikes, or if so not as above.
j. Perianth with three parts united into a crested organ. POLYGALACEAE 286
j. Perianth with parts not united into a crested organ.
k. Ovary 1, 1-celled (rarely 2-celled in Sparganiaceae).
l. Ovule 1.
m. Stipules sheathing; fruit lenticular or sharply 3-angled .... POLYGONACEAE 185
m. Stipules not sheathing, often wanting; fruit not as above.
n. Leaves parallel-veined, linear; monoecious monocotyledons .... SPARGANIACEAE 44
n. Leaves netted-veined; dicotyledons.
o. Style or stigma 1.................. URTICACEAE 180
o. Styles or stigmas 2–5.
p. Leaves deeply palmately cleft or compound. *Cannabis* 182 and *Humulus* 182
p. Leaves pinnately lobed, serrate, or entire.
q. Stipules, if any, not scarious.
r. Flowers in dense scarious-bracted and often spiny clusters... AMARANTHACEAE 196
r. Flowers often in dense clusters but not scarious-bracted; often mealy. CHENOPODIACEAE 193
q. Stipules scarious .... ILLECEBRACEAE 197
l. Ovules several or many.
m. Leaves elliptic-linear.
n. Placenta free-central; leaves rather soft. CARYOPHYLLACEAE 198
n. Placentae parietal; leaves firm....... CISTACEAE 301
m. Leaves oval, suborbicular, or pinnatifid.
n. Plants more or less creeping, in wet places; flowers small, greenish; juice colorless..*Chrysosplenium* 238
n. Plants erect, in drier places; flowers larger, white or yellow (calyx caducous, flowers therefore appearing apetalous); juice colored.
o. Placentae 2–5 .... PAPAVERACEAE 220
o. Placenta 1 .... BERBERIDACEAE 218

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k. Ovary 2–many-celled, or ovaries several.
  l. Ovary 1, 5-celled, 5-lobed; plants not tall. *Penthorum* 230
  l. Ovary 1, 10-celled, unlobed; tall, coarse plants. PHYTOLACCACEAE 197
  l. Ovary 1 or several, 1-celled; leaves compound or deeply lobed ........................RANUNCULACEAE 207
  l. Ovary 1, 3-celled, or 3 and each 1-celled; leaves not lobed nor compound.
    m. Flowers minute, greenish.
      n. Leaves whorled, netted-veined.........AIZOACEAE 198
      n. Leaves not whorled.
        o. Leaves netted-veined, not grass-like; dicotyledons ........................EUPHORBIACEAE 287
        o. Leaves parallel-veined, grass-like; monocotyledons ........................JUNCAGINACEAE 52
    m. Flowers larger, green or colored; leaves usually parallel-veined; monocotyledons.
      n. Perianth 2-lipped; seed solitary........*Pontederia* 137
      n. Perianth regular; seeds 1–many........LILIACEAE 142

h. Woody plants.
  i. Flowers, at least the staminate ones, in aments.
    j. Ovary dehiscent, with many comose seeds; a glandular disk or lobe at base of each flower..............SALICACEAE 161
    j. Ovary indehiscent, each cell with 1–2 naked seeds; disk wanting.
      k. Ovary 1-celled.
        l. Fruit fleshy; leaves broad....................*Morus* 182
        l. Fruit dry or waxy; leaves lanceolate or oblanceolate. MYRICACEAE 171
      k. Ovary 2-celled; leaves broad.............BETULACEAE 174
  i. Flowers not in aments.
    j. Flowers in dense globular pendent heads; fruits long-hairy; leaves angular ....PLATANACEAE 241
    j. Flowers not as above.
      k. Plants recurved or brier-like, prickly, monocotyledons. *Smilax* 149
      k. Plants ordinary shrubs or trees, dicotyledons.
        l. Ovary 2–many-celled.
          m. Styles 1–2.
            n. Fruit a double samara...............ACERACEAE 293
            n. Fruit a single samara.................*Fraxinus* 340
          m. Styles 3–4 or 3–4-cleft.............RHAMNACEAE 295
        l. Ovary 1-celled.
          m. Leaves and twigs peltate-scaly......ELAEAGNACEAE 311
          m. Leaves and twigs not peltate-scaly.
            n. Calyx tube cylindrical or urn-shaped. THYMELAEACEAE 311
            n. Calyx tube short or none.
              o. Flowers yellowish, often showy; bark spicy; anthers opening by uplifting valves. LAURACEAE 219
              o. Flowers green or brown; bark not spicy; anthers not opening as above......URTICACEAE 180

e. Corolla polypetalous (petals slightly coherent in Fumariaceae). (3d *e*, p. 22.)

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f. Herbs. (2d *f*, p. 21.)
  g. *Stamens perigynous.*
    h. Leaves compound, leaf and leaflets with pulvini; flowers often papilionaceous .... LEGUMINOSAE 270
    h. Leaves simple or compound, without pulvini; flowers not papilionaceous.
      i. Anthers usually long and curved, opening by terminal pores. MELASTOMACEAE 312
      i. Anthers opening longitudinally.
        j. Sepals 2 .... PORTULACACEAE 204
        j. Sepals 5 or calyx 5-lobed.
          k. Ovaries 1–several, 1-celled, or if 2-celled then deeply lobed.
            l. Carpels 2; fruit not bur-like .... SAXIFRAGACEAE 237
            l. *Carpels 2–many; fruit often bur-like* .... ROSACEAE 241
          k. Ovary 1, 2–5-celled, not plainly lobed .... LYTHRACEAE 311
  g. Stamens hypogynous.
    h. Stamens monadelphous or diadelphous, at least below.
      i. Flowers irregular.
        j. Corolla or calyx spurred or saccate.
          k. Ovary 1-celled .... FUMARIACEAE 221
          k. Ovary 5-celled .... BALSAMINACEAE 295
        j. *Corolla and calyx not spurred nor saccate; petals fringed.* POLYGALACEAE 286
      i. Flowers regular.
        j. Ovary 1-celled; corolla spurred or saccate ... FUMARIACEAE 221
        j. Ovary 1-celled; placenta free-central; stamens opposite the petals .... PRIMULACEAE 337
        j. Ovary 4–many-celled; placentae axial; stamens alternate with the petals, or more numerous than the petals.
          k. Stamens very numerous, united more than half their length, forming a central column around the pistil. MALVACEAE 298
          k. Stamens united only at base.
            l. Stamens 10; leaves 3-foliolate .... OXALIDACEAE 283
            l. *Stamens 5; leaves simple* .... LINACEAE 282
    h. Stamens separate (rarely united in fascicles in Hypericaceae).
      i. Pistils 2–many, distinct.
        j. Leaves peltate; aquatic plants .... NYMPHAEACEAE 205
        j. Leaves not peltate.
          k. Petals 3, white; monocotyledons .... ALISMACEAE 53
          k. Petals 4 or more, often colored; dicotyledons.
            l. Leaves scarcely fleshy .... RANUNCULACEAE 207
            l. Leaves very fleshy .... CRASSULACEAE 236
      i. Pistil solitary.
        j. Ovary 1-celled. (2d *j*, p. 21.)
          k. Plants insectivorous; leaves covered with glandular tentacles .... DROSERACEAE 235
          k. *Plants not insectivorous; tentacles wanting.*
            l. Styles 2–9 or 2–9-parted.
              m. Sepals 2 (3) .... PORTULACACEAE 204
              m. Sepals 4–5, distinct or united.
                n. Disk cup-shaped, glandular, at base of ovary. RESEDACEAE 235

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n. Disk wanting.
o. Placentae parietal; foliage punctate. HYPERICACEAE 300
o. Placenta free-central; foliage not punctate. CARYOPHYLLACEAE 198
l. Style 1, stigmas 1–4 (placentae parietal).
m. Placentae 2–5.
n. Calyx deciduous, often caducous.
o. Sepals 2 or united, falling very early. PAPAVERACEAE 220
o. Sepals 4, falling while in flower. CAPPARIDACEAE 235
n. Calyx persistent in fruit.
o. Flowers regular.
p. Sterile stamens wanting........... CISTACEAE 301
p. Sterile stamens present............. *Parnassia* 239
o. Flowers irregular .... VIOLACEAE 302
m. Placenta 1.
n. Stamens as many as the petals and opposite them; anthers opening by uplifting valves, or basal leaves peltate .... BERBERIDACEAE 218
n. Stamens more numerous than the petals; anthers not opening by uplifting valves. RANUNCULACEAE 207
j. Ovary 2–many-celled.
k. Plants aquatic; leaves deeply cordate.... NYMPHAEACEAE 205
k. Plants terrestrial.
l. Style dilated, umbrella-like; leaves tubular. SARRACENIACEAE 235
l. Style ordinary; leaves not tubular.
m. Anthers opening by terminal pores, often inverted. ERICACEAE 329
m. Anthers opening longitudinally.
n. Stamens tetradynamous or 2; ovary 2-celled. CRUCIFERAE 222
n. Stamens not tetradynamous nor 2.
o. Styles 2–7 or stigmas 5.
p. Ovules numerous in each cell.
q. Leaves alternate .... *Penthorum* 236
q. Leaves whorled, not punctate; stamens 6. *Trillium* 148
q. Leaves opposite, punctate; stamens many. HYPERICACEAE 300
p. Ovules 1–2 in each cell......... GERANIACEAE 284
o. Style 1, stigmas 1–3.
p. Leaves parallel-veined; petals 3, deliquescent. COMMELINACEAE 136
p. Leaves netted-veined.
q. Leaves simple.
r. Petals 3–5; stamens 2–many... CISTACEAE 301
r. Petals 4; stamens 2............ *Lepidium* 224
q. Leaves pinnately divided.. LIMNANTHACEAE 290
f. Woody plants.
g. Pistils several.
h. Leaves glandular-punctate, compound; stamens 4–5. RUTACEAE 286

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h. Leaves not punctate, simple; stamens 12–many.
  i. Plants twining .... MENISPERMACEAE 218
  i. Plants neither twining nor climbing.
    j. Flowers hypogynous .... MAGNOLIACEAE 217
    j. Flowers perigynous .... ROSACEAE 241
g. Pistil 1.
  h. Stamens 15 or more .... TILIACEAE 297
  h. Stamens less than 15.
    i. Style 1 (often several stigmas or branches) or none.
      j. Anthers opening by apical valves; leaves or twigs usually more or less spiny .... *Berberis* 219
      j. Anthers ordinary, or opening by terminal valveless pores.
        k. Ovary 1-celled .... LEGUMINOSAE 270
        k. Ovary 2–8-celled.
          l. Flowers irregular .... HIPPOCASTANACEAE 294
          l. Flowers regular or nearly so.
            m. Leaves rusty-tomentose beneath; anthers opening by terminal pores .... *Ledum* 333
            m. Leaves not tomentose; anthers opening longitudinally.
              n. Stamens opposite the petals.
                o. Petals valvate; plants climbing .... VITACEAE 296
                o. Petals involute; plants erect ..... RHAMNACEAE 295
              n. Stamens alternate with the petals.
                o. Plant a vine .... *Celastrus* 292
                o. Plant not a vine.
                  p. Leaves opposite, simple .... *Evonymus* 292
                  p. Leaves alternate.
                    q. Leaves pinnate; fruit a samara. SIMARUBACEAE 286
                    q. Leaves simple; fruit a berry. AQUIFOLIACEAE 291
    i. Styles 2–3.
      j. Leaves opposite.
        k. Leaves simple; fruit a samara .... ACERACEAE 293
        k. Leaves 3-foliolate; fruit a bladdery pod. STAPHYLEACEAE 292
      j. Leaves alternate.
        k. Leaves compound; summer-flowering .... ANACARDIACEAE 290
        k. Leaves simple; petals strap-shaped; autumn-flowering. HAMAMELIDACEAE 241
e. Corolla gamopetalous.
  f. Stamens (fertile) 2–4.
    g. Ovary 4-celled, deeply 4-lobed; stems mostly 4-angled. LABIATAE 354
    g. Ovary 1-celled (see also 3d *g*).
      h. Plants parasitic, not green .... OROBANCHACEAE 376
      h. Plants not parasitic, green.
        i. Flowers regular or nearly so .... GENTIANACEAE 341
        i. Flowers conspicuously irregular.
          j. Stamens 2 .... LENTIBULARIACEAE 377
          j. Stamens 4, didynamous .... PHRYMACEAE 379
    g. Ovary 2–4-celled, not deeply lobed.
      h. Plants parasitic, not green, twining .... *Cuscuta* (in part) 347
      h. Plants slightly or not at all parasitic, green, not twining.
        i. Flowers scarious, greenish, in dense spikes .. PLANTAGINACEAE 379

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i. Flowers ordinary, petaloid.
j. Plants woody ....OLEACEAE 340
j. Plants herbaceous.
k. Ovule 1 in each of the 4 cells............VERBENACEAE 354
k. Ovules 2–many in each of the 2 cells.
l. Capsule with elastic valves; flowers in dense peduncled axillary spikes or heads..............ACANTHACEAE 378
l. Capsule without elastic valves; flowers not as above. SCROPHULARIACEAE 368

f. Stamens 5, rarely 6 (see also 3d *f*).
g. Ovaries 2, distinct or nearly so; juice usually milky; seeds with hairy appendages.
h. Filaments distinct; styles and stigmas united; corolla convolute; pollen granular ....APOCYNACEAE 343
h. Filaments united; styles separate; stigmas united and fused with the anthers; corolla valvate or convolute; pollen in masses. ASCLEPIADACEAE 345
g. Ovary 1; seeds not appendaged.
h. Ovary deeply 4-lobed.........................BORAGINACEAE 350
h. Ovary not 4-lobed.
i. Ovary 1-celled.
j. Leaves 3-foliolate ....*Menyanthes* 343
j. Leaves dentate, cleft, or pinnatifid.....HYDROPHYLLACEAE 349
j. Leaves entire or nearly so, not as above.
k. Stamens opposite the lobes of the corolla; placenta free-central; ovules many...................PRIMULACEAE 337
k. Stamens alternate with the corolla lobes; placentae parietal.
l. Leaves opposite; ovules many..........GENTIANACEAE 341
l. Leaves alternate; ovules 3–5........CONVOLVULACEAE 346
i. Ovary 2–5-celled.
j. Ovary 2–4-celled.
k. Corolla plicate; stamens often centrally connivent; fruit frequently a berry.......................SOLANACEAE 365
k. Corolla not plicate; stamens not conspicuously connivent; fruit dry.
l. Ovules numerous.
m. Ovary 2-celled.
n. Corolla rotate ....*Verbascum* 369
n. Corolla funnel-form ....*Lycium* 367
m. Ovary 3-celled ..................POLEMONIACEAE 349
l. Ovules 1–2 in each cell.
m. Fruit a capsule; plants sometimes without green color .........................CONVOLVULACEAE 346
m. Fruit of 2–4 nutlets; plants green...BORAGINACEAE 350
j. Ovary 5-celled ....*Rhododendron* 333

f. Stamens 6–many.
g. Flowers very irregular.
h. Lip of corolla crested; sepals unequal, petaloid..POLYGALACEAE 286
h. Lip of corolla naked; sepals equal, united, not petaloid. *Trifolium* 273
g. Flowers regular or nearly so.
h. Ovary 1-celled; green herbs...................PRIMULACEAE 337
h. Ovary 5- rarely 10-celled; shrubs, suffrutescent herbs, or saprophytic non-chlorophyll-bearing herbs.........ERICACEAE 329

KEY TO THE FAMILIES OF ANGIOSPERMS CONTAINING DIOECIOUS SPECIES

PAGE

a. *Woody plants.*
  b. Leaves opposite.
    c. Plants scurfy, covered with silvery or brown peltate scales; leaves simple. ELAEAGNACEAE 311
    c. Plants not peltate-scurfy; leaves compound.
      d. Leaflets 3, rarely 5; stamens 5–10; calyx 5-parted; wing of fruit unsymmetrical .... ACERACEAE 293
      d. Leaflets 5–11; stamens 2 (4); calyx 4-parted; wing of fruit symmetrical. *Fraxinus* 340
  b. Leaves alternate.
    c. Stem twining or recurved and brier-like.
      d. Flowers umbellate; stems usually prickly; monocotyledons...... *Smilax* 149
      d. Flower paniculate; stems not prickly; dicotyledons.... MENISPERMACEAE 218
    c. Stems neither twining nor brier-like.
      d. Flowers in catkins or short spikes, or often in peduncled subpaniculate heads.
        e. Perianth 4–5-parted or differentiated into calyx and corolla, not glandular; bud scales several.
          f. Pith of twigs continuous........ URTICACEAE 180
          f. Pith of twigs with woody diaphragms........ *Nyssa* 329
        e. Perianth finger-like or cup-shaped, glandular, not parted; bud scale 1 or several (see also 3d *e*)........ SALICACEAE 161
        e. Perianth none; bud scales several........ MYRICACEAE 171
      d. Flowers not in catkins or short spikes.
        e. Leaves pinnately compound.
          f. Leaflets dotted, crenulate or entire; shrubs; twigs dark, prickly. *Zanthoxylum* 286
          f. Leaflets not dotted, with a few coarse basal teeth; trees; twigs pale, not prickly .... SIMARUBACEAE 286
        e. Leaves simple.
          f. Leaves serrate-dentate; twigs not spicy........ URTICACEAE 180
          f. Leaves entire or lobed; twigs spicy........ LAURACEAE 219
a. Herbs.
  b. Flowers in involucrate heads........ COMPOSITAE 394
  b. Flowers not in involucrate heads.
    c. Plants aquatic, submerged, flaccid.
      d. Leaves opposite, cauline........ NAJADACEAE 46
      d. Leaves whorled and cauline, or basal........ HYDROCHARITACEAE 54
    c. *Plants not as above.*
      d. Flowers with both calyx and corolla.
        e. *Leaves simple.*
          f. Corolla of 3 petals; erect herbs........ ALISMACEAE 53
          f. Corolla deeply 5-parted, or petals 5; vines........ CUCURBITACEAE 392
        e. Leaves compound; corolla of 5 petals; erect herbs........ *Panax* 319
      d. Flowers apetalous or perianth parts all similar (see also Panax).
        e. Flowers umbellate; plants with tendrils and recurved stems.... *Smilax* 149
        e. Flowers not umbellate.
          f. Flowers on a spadix inclosed in a spathe........ ARACEAE 134
          f. Flowers not as above.
            g. Leaves ternately decompound........ *Thalictrum* 214
            g. Leaves simple.
              h. Leaves with sheathing scarious stipules........ POLYGONACEAE 185

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h. Leaves without such stipules.
 i. Leaves 3–many-lobed or -parted..................URTICACEAE 180
 i. Leaves not lobed.
  j. Plants parasitic on trees, often without green color.
LORANTHACEAE 184
  j. Plants not parasitic.
   k. Flowers inclosed between two deltoid bracts; plants more or less mealy........................CHENOPODIACEAE 193
   k. Flowers not inclosed between deltoid bracts; plants not mealy.
    l. Leaves netted-veined; dicotyledons........URTICACEAE 180
    l. Leaves parallel-veined; monocotyledons..*Chamaelirium* 143

DIVISION I. PTERIDOPHYTA

1. POLYPODIACEAE (FERN FAMILY)[2]

ARTIFICIAL KEY TO THE GENERA

a. Sori (with indusia) inclosed in globular or necklace-like parts of the much-modified and contracted fertile fronds.
  b. Sterile fronds 1-pinnatifid; veins netted; fertile fronds 2-pinnate; rootstocks creeping.[3] 4. ONOCLEA
  b. Sterile fronds 2-pinnatifid; veins free; fertile fronds 1-pinnate; rootstocks short, erect. 3. PTERETIS
a. Sori exposed or simply covered by the reflexed margin of the frond.
  b. Sori marginal, the indusium appearing to consist of the reflexed margin of the frond; rootstocks creeping.
    c. Sorus apparently continuous along the whole margin.
      d. Fronds very large, broadly triangular, 1–3-pinnate. 15. PTERIDIUM
      d. Fronds small, ovate-oblong.
        e. Fronds delicate, membranous. 13. CRYPTOGRAMMA
        e. Fronds coriaceous. 12. PELLAEA
    c. Sori several or many, distinct.
      d. Sori sublunate, at the tips of the fan-shaped pinnules; fronds pedate. 14. ADIANTUM
      d. Sori as broad as long, marginal or partly covered by a reflexed tooth of the incised pinnule in addition to the true cup-shaped indusium; fronds 2-pinnate. 7. DENNSTAEDTIA
  b. Sori dorsal, though sometimes near the margin; indusium independent of the margin of the frond.
    c. Sori elongated.
      d. Veins free except the lowest, the tips not anastomosing; fronds 1–2-pinnate.
        e. Sori semi-elliptical or some of them horseshoe-like, attached to the lateral veins only; rootstocks not creeping.
          f. Indusium straight; fronds 1-pinnate, with black stipes; xylem in cross section of stipe X-, Y-, or T-shaped, or of two strands, the edges of the plates toward the upper side of the stipe not inflexed; cells of the scales rectangular, with thick, dark walls; small evergreen ferns. 10. ASPLENIUM
          f. Indusium straight or horseshoe-shaped; fronds 1–2-pinnate, with pale stipes; xylem V-shaped or of two strands, the edges of the plates toward the upper side of the stipe strongly inflexed; cells of the scales more acute or fibrous-tipped, thinner and paler-walled; larger herbaceous ferns. 8. ATHYRIUM
        e. Sori oblong or linear, extending along both the lateral veins and the midrib of the pinnae; rootstocks creeping. 11. WOODWARDIA
      d. Veins netted; fronds lanceolate, undivided, rooting at the slender tip; sori variously disposed. 9. CAMPTOSORUS
    c. Sori orbicular or nearly so.
      d. Indusium superficial or wanting; fronds often evergreen.
        e. Fronds articulated with the creeping rootstocks, 1-pinnatifid, the divisions confluent at the base; sori naked. 16. POLYPODIUM
        e. Fronds not articulate, 1–3-pinnate, if 1-pinnate the divisions distinct; rootstocks creeping or not creeping; sori naked or covered.
          f. Indusium cordate or wanting; pinnae pinnatifid or pinnate. 5. THELYPTERIS

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[2] For changes in the nomenclature of the ferns, see Rhodora, vol. 21, p. 173, 1919.
[3] Ferns with creeping rootstocks have scattered fronds; those with short or upright rootstocks have the fronds in clusters.

f. Indusium, in local species, entire, peltate; pinnae serrate only, in local species. 6. POLYSTICHUM
d. Indusium inferior; fronds not evergreen.
e. Rootstocks not creeping; sori exposed.
f. Indusium opening on one side. 2. CYSTOPTERIS
f. Indusium splitting into many stellate-spreading shreds. 1. WOODSIA
e. Rootstocks creeping; each sorus and its true cup-shaped indusium margined or partly covered by a reflexed tooth of the frond. 7. DENNSTAEDTIA

1. Woodsia R. Br.

a. Stipe articulated a short distance above the base; pinnae chaffy; fronds 5–14 cm. high; indusium divided into slender hairs. 1. *W. ilvensis*
a. Stipe not articulated; pinnae not chaffy, sparingly glandular-pubescent; fronds 20–50 cm. high; indusium split into a few broad divisions. 2. *W. obtusa*

1. **W. ilvensis** (L.) R. Br.

Dry exposed sandstone crests, in subacid soils; scarce. June 10–Sept. 15.

Caroline, ledge on North Pinnacle; Fall Creek, n. side above and below Triphammer Bridge (*D.* in C. U. Herb.!); ravine between Renwick and McKinneys (*K. M. W. & A. R. Bechtel*); Taughannock Gorge, n. side above the falls (*A. J. E. & L. H. MacDaniels*).

Lab. to Alaska, southw. to s. N. E., N. Y., Ky., and Iowa, and in the mts. to N. C., including the northern Atlantic Coastal Plain. Found also in Greenland and Eurasia.

2. **W. obtusa** (Spreng.) Torr.

Dry but more shaded sandstone cliffs, in calcareous or somewhat acid soils; frequent. *June 25–July.*

Enfield Glen, n. side, on high cliffs above the talus; South Hill, in the "Incline" cut; Fall Creek (*D.* in C. U. Herb.); McKinney Twin Glens; ravine n. of Esty, on the dry cliffs of the n. side; probably elsewhere.

Cent. Me. to Wis., southw. to Ga., Ala., Tex., and Ariz., including the northern Coastal Plain; also in Alaska and B. C.

The veinlets in both species of Woodsia emerge from the parenchyma on the upper side near the tips, thus producing short linear markings which are characteristic. *W. obtusa* may be distinguished from *Cystopteris fragilis*, for which it is frequently mistaken, by its less cuneate and more crenate segments, which, together with the stipe, are more or less pubescent.

2. Cystopteris Bernh.

a. Fronds lanceolate, attenuate, often bulblet-bearing beneath; segments and teeth crowded; rhachis not winged; pinnules mostly oblong, obtuse at each end; indusium truncate on the free side. 1. *C. bulbifera*
a. Fronds ovate-oblong, acute, not bulblet-bearing; segments and teeth more distant, decurrent on the slightly margined rhachis; pinnules mostly oval, more pointed and more cuneate; indusium acute or acuminate, and often lacerate on the free side. 2. *C. fragilis*

1. **C. bulbifera** (L.) Bernh. BLADDER FERN.

Damp or wet shaded calcareous cliffs and humus, in ravines, and in the vicinity of marl springs; very common. July–Aug.

In all the ravines of the basin, where it festoons the rocky walls; also in swamps, as s. of Caroline Depot, along Mud Creek and Beaver Brook, and on Big Gully Point.

Newf. to Man., southw. to Ga., Ala., Ark., and Iowa; rare or absent on the Coastal Plain and in granitic N. E.

2. **C. fragilis** (L.) Bernh. BLADDER FERN.

Damp or rather dry shaded cliffs and banks, in somewhat calcareous or even subacid gravels and shales; less common than the preceding. June 10–Aug. 10.

In nearly all the ravines of the basin, also in steep rocky hillside woods.

Newf. and Lab. to Alaska, southw. to Ga., Ala., Kans., Ariz., and s. Calif., including the Atlantic Coastal Plain. Almost cosmopolitan.

3. **Pteretis** Raf.

1. **P. nodulosa** (Michx.) Nieuwl. (*Onoclea Struthiopteris* of authors.) OSTRICH FERN.

Open alluvial slightly acid or slightly calcareous soil, especially on the flood plains of streams; frequent. Sept.–Oct.

Key Hill swamp; Inlet, near Lick Brook; Negundo Woods; Etna; Fall Creek, e. *of Freeville; Isoëtes Pond, Cortland marl ponds; Salmon Creek, s. of Genoa; Paine* Creek; Big Gully Point.

Newf. to B. C., southw. to Va. and Iowa; rare or absent on the Atlantic Coastal Plain.

Slender stolons produce new clumps of fronds.

4. **Onoclea** L.

1. **O. sensibilis** L. SENSITIVE FERN.

Low meadows and thickets, in slightly calcareous or slightly acid soils; common, and generally distributed. Sept.–Oct.

Newf. to Sask., southw. to Fla. and Okla., including the Coastal Plain. Found also in e. Asia.

5. **Thelypteris** Schmidel

a. Indusium wanting; rootstocks creeping; fronds easily killed by the frost.
  b. Basal pinnae stalked, rhachis of the frond not winged; blade nearly horizontal, subternate; veins simple or once forked. 1. *T. Dryopteris*
  b. Basal pinnae sessile or partly adnate, the rhachis more or less winged; blades suberect, not ternate.
    c. Fronds usually broader than long, finely puberulent or glandular beneath, or with a few white scales along the veins; rhachis above the lowest pair of pinnae winged; these pinnae 2.5–7 cm. wide, in the same plane as the rest of the blade; pinnules of the lowest pinnae longer than in the next species, and *often pinnatifid; veins of the pinnules on the lowest pair of pinnae several* times forked. 2. *T. hexagonoptera*
    c. Fronds longer than broad, more coarsely pubescent beneath and with prominent brown scales along the veins; rhachis above the lowest pair of pinnae practically wingless; these pinnae 1.5–2.5 cm. wide, bent upward, perpendicular to the leaf surface; veins simple or once forked. 3. *T. Phegopteris*

a. Indusium present, horseshoe-shaped or reniform.
  b. Rootstocks creeping; veins simple or once forked; fronds easily killed by the frost, often pubescent.
    c. Lowest pinnae scarcely smaller than the middle ones; fronds ovate or narrowly ovate, truncate at base, long-stalked; margins of the fertile pinnules revolute; veins forked; indusium glandless. 4. *T. palustris*
    c. Lowest pinnae smaller than the middle ones; fronds tapering both ways from the middle; margins of the fertile pinnules flat; veins simple; indusium glandular. 5. *T. noveboracensis*
  b. Rootstocks short, suberect; veins, at least the lowest, more than once forked; fronds cespitose, evergreen or subevergreen, never pubescent.
    c. Fronds 2-pinnatifid or 2-pinnate, obscurely or plainly spinulose-serrate.

d. Sori near the margin; pinnules obscurely crenate-serrate; basal scales bright brown. 6. *T. marginalis*

d. Sori not near the margin.

e. Fronds 18–40 cm. wide; pinnae broadest in the middle; pinnules obscurely serrate, oblong-linear; basal scales with a dark center. 7. *T. Goldiana*

e. Fronds 18 cm. wide or less; pinnae broadest at the base; pinnules coarsely spinulose-serrate, short-oblong; basal scales brown, without a dark center.

f. Fronds narrow; pinnae 3–8 cm. long, the lowest, at least, ovate; sori as near the margin as the midvein. 8. *T. cristata*

f. Fronds broader; pinnae 8 cm. long or more, oblong-lanceolate; sori often near the midvein. 8a. *T. c.*, var. *Clintoniana*

c. Fronds 3-pinnatifid or 3-pinnate; ultimate segments spinulose-toothed and incised.

d. Indusium glabrous; segments of the pinnules subacute, somewhat falcate; scales of the stipe pale throughout; fronds usually less finely divided than in the variety; pinnae usually more ascending. 9. *T. spinulosa*

d. Indusium glandular; segments of the pinnules usually straight, and commonly subtruncate; scales of the stipe pale with a dark center; fronds finely dissected. 9a. *T. s.*, var. *intermedia*

. **T. Dryopteris** (L.) Slosson. (*Phegopteris Dryopteris* (L.) Fée.) OAK FERN.

Damp shaded woods in ravines and about swamps, in deep humus, rarely in dry upland woods; frequent. June 15–July.

S. of Caroline Depot; Michigan Hollow Swamp; n. and e. of Danby village; Ellis Hollow; Beaver Brook; arbor vitae swamp e. of Clyde; and in many of the ravines of the basin.

Newf. and Lab. to Alaska, southw. to Va., Kans., Colo., and Oreg.; rare or absent on the Atlantic Coastal Plain. Found also in Greenland and Eurasia.

2. **T. hexagonoptera** (Michx.) Weatherby. (*Phegopteris hexagonoptera* (Michx.) Fée.) BEECH FERN.

Damp or rather dry, shady, stony or gravelly, sterile, subacid neutral to slightly calcareous, soils, with much humus; infrequent. June 25–Aug. 10.

North Spencer, top of hill n. w. of station; n. of Slaterville Swamp; lower entrance to Enfield Glen; Amphitheater, Six Mile Creek; Fall Creek woods (*D.* in C. U. Herb.); Warren woodlot n. of Fall Creek, above Forest Home; s. side of Shurger Glen; border of swamp on hill w. of Genoa; low pasture, Canoga.

Cent. Me. to w. Que. and Minn., southw. to Fla., La., Iowa, and Okla.; occasional on the Coastal Plain.

3. **T. Phegopteris** (L.) Slosson. (*Phegopteris polypodioides* Fée.) BEECH FERN.

Damp or dry shaded cliffs in ravines and in damp woodlands, in humus mostly on neutral shales and gravels; scarce. June 25–July.

Enfield Glen, in several places; the narrows between Slaterville and Caroline Center (*K. M. W., A. J. E., & L. F. Randolph*); low woods, Fir Tree Swamp, Freeville (*A. J. E. & A. Gershoy*).

Newf. (Greenland) to Alaska, southw. to N. Y., Va., Wis., Iowa, and Wash.; rare on the Atlantic Coastal Plain. Found also in Eurasia.

4. **T. palustris** Schott. (*Aspidium Thelypteris* (L.) Sw.) MARSH SHIELD FERN.

Boggy meadows, pond shores, and ditches, in acid or slightly calcareous soils; common. Aug. 25–Sept.

About the bogs of Spencer, Danby, Caroline, Ithaca, Dryden, and McLean, and those north of Cayuga Lake.

Newf. to Man., southw. to Fla., La., and Tex., including the Coastal Plain. Found also in Eurasia.

5. **T. noveboracensis** (L.) Nieuwl. (*Aspidium noveboracensis* (L.) Sw.) NEW YORK FERN.

Damp woodlands, in rich deep humus over gravelly acid or slightly calcareous soils; common. Aug.–Sept. 15.

West Danby; Connecticut Hill; Enfield Glen; Six Mile Creek; Ringwood; woods, McLean Bogs; Beaver Brook; Spring Lake; and elsewhere.

Newf. to Ont. and Minn., southw. to Ga., Ala., and Ark., including the Coastal Plain.

6. **T. marginalis** (L.) Nieuwl. (*Aspidium marginale* (L.) Sw.) MARGINAL SHIELD FERN.

Wooded slopes, especially about the ravines, in light humus over both acid and calcareous soils; common. June 20–July.

N. S. to B. C., southw. to Ga., Ala., Ark., Kans., and Okla.; less frequent on the Atlantic Coastal Plain.

7. **T. Goldiana** (Hook.) Nieuwl. (*Aspidium Goldianum* Hook.) GOLDIE'S FERN.

Deep, rich, mostly bottom-land woods, in humus, usually over calcareous soils; scarce. July–Aug.

Edge of Michigan Hollow Swamp; Enfield Glen, below Lucifer Falls; Six Mile Creek, below the Narrows and in the Amphitheater; Taughannock Gorge; Salmon Creek, two miles n. of Ludlowville and also s. of Genoa; Paine Creek; near Stark Pond.

Cent. Me. to Minn., southw. to N. C., Tenn., and Iowa; rare near the coast. A plant of the rich soil districts of the interior.

8. **T. cristata** (L.) Nieuwl. (*Aspidium cristatum* (L.) Sw.) SWAMP SHIELD FERN.

Low boggy woodlands and sedgy swamps, in both acid and calcareous soils; frequent. June 25–Aug. 15.

W. of Key Hill; Ringwood; Dryden Lake; swamps of Freeville; Mud Creek, Freeville; McLean; Beaver Brook; and elsewhere.

Newf. to Sask., southw. to Va., Ky., Ark., Nebr., and Idaho, including the Coastal Plain. Found also in Eurasia. Passing by insensible gradations to:

8a. **T. cristata** (L.) Nieuwl., var. **Clintoniana** (D. C. Eaton) Weatherby.

Low boggy woodlands; infrequent. June 25–Aug. 15.

Ringwood; Etna; Fir Tree Swamp, Freeville; Mud Creek, Freeville; Malloryville Bog; Townley Swamp; w. of East Genoa; Spring Lake.

N. H. to Wis., southw. to N. C.; rare on the Coastal Plain.

This species hybridizes with *T. marginalis* and *T. spinulosa* including var. *intermedia*.

9. **T. spinulosa** (O. F. Müll.) Nieuwl. (*Aspidium spinulosum* (O. F. Müll.) Sw.) SPINY-TOOTHED SHIELD FERN.

Damp shady woodlands, in mucky acid or rarely subcalcareous soil; frequent. June 15–Aug.

Michigan Hollow; n. of Slaterville; w. of Dryden Lake; Ringwood Swamp; Townley Swamp; low woods w. of East Genoa; n. of Mecklenburg.

Lab. to the Selkirks and Idaho, southw. to Va. and Ky., though sparingly on the Coastal Plain. Found also in Greenland and Eu.

A form occurs occasionally with the segments of the upper or of all the pinnae distant.

9a. **T. spinulosa** (O. F. Müll.) Nieuwl., var. **intermedia** (Muhl.) Weatherby.

Damp woodlands and ravine banks, in rich acid or subcalcareous humus; very common and widely distributed except on the heavier soils. June 15–Aug.

Newf. to Wis., southw. to N. C. and Mo., including the Coastal Plain.

In the borders of swamps where *T. cristata* occurs, plants are often found which are more or less intermediate in character between *T. cristata* and *T. spinulosa*, var. *intermedia*, and which are probably hybrids of these two forms. They constitute what has passed as *Aspidium Boottii*. These plants are not constant in character, but seem to represent various combinations of the characters of the two parents.

6. Polystichum Roth

1. **P. acrostichoides** (Michx.) Schott. (*Aspidium acrostichoides* of authors.) CHRISTMAS FERN.

Dry rocky, sandy, or gravelly woodlands, in neutral, slightly calcareous to acid, soils; common, especially in ravines, and very generally distributed. June 10–July.

N. S. to Ont. and Wis., southw. to Ga., Fla. (?), and Tex., including the Coastal Plain.

A form with the pinnae incised or pinnatifid and the fertile part usually less contracted, is forma *incisum* (Gray) Gilbert.

7. Dennstaedtia Bernh.

1. **D. punctilobula** (Michx.) Moore. (*Dicksonia punctilobula* and *D. pilosiuscula* of authors.) HAY-SCENTED FERN.

Dry or damp sterile open woods, hillside pastures, and about swamps, in gravelly, weakly calcareous to more or less acid, soils; locally very common. July 25–Sept. 15.

Abundant in the McLean and Freeville region; rare about Ithaca; occasional elsewhere, as: n. w. of Spencer station; n. of Caroline Center; Besemer; Six Mile Creek; w. of Townley Swamp; Howland Island; Botrychium Woods, Spring Lake.

N. S. to Minn., southw. to Ga. and Mo.; less frequent on the Coastal Plain, and lacking in the more sandy parts of that region.

8. Athyrium Roth

a. Fronds 1-pinnate. — 1. *A. angustifolium*
a. Fronds 2-pinnate.
  b. Sori straight; segments slightly crenate. — 2. *A. acrostichoides*
  b. Sori mostly curved, often horseshoe-shaped; segments incised or sharply serrate. — 3. *A. angustum*

1. **A. angustifolium** (Michx.) Milde. (*Asplenium angustifolium* Michx.) SPLEENWORT.

Rich bottom-land woods, or deep woods on ravine slopes, with much humus, mostly in neutral soils; infrequent. Aug. 15–Sept. 20.

Enfield Glen, just below Lucifer Falls; Six Mile Creek, s. side below the Narrows (*D.* in C. U. Herb.!); Taughannock Gorge; Salmon Creek, Genoa; Paine Creek; Big Gully; rich woods near Stark Pond; low woods s. w. of Westbury.

W. Que. to Wis., southw. to Ga., Ala., Mo., and Kans. A plant of the rich lands of the interior.

2. **A. acrostichoides** (Sw.) Diels. (*Asplenium acrostichoides* Sw., *A. thelypteroides* Michx.) SPLEENWORT.

Deep rich woods, in humus over rocky or gravelly subcalcareous or slightly acid soils; infrequent. July 25–Sept. 15.

N. e. of Spencer Lake; Newfield Glen; Enfield Glen, just below Lucifer Falls; Six Mile Creek, s. side below the Narrows (*D.* in C. U. Herb.!); Salmon Creek; Big Gully.

N. S. to Minn., southw. to Ga., Ala., and Mo.; rare on the Coastal Plain. A plant primarily of the Allegheny region. Found also in Asia.

Sterile fronds, especially when young, often resemble those of *Thelypteris noveboracensis*, from which they may be distinguished by the shaggy pubescence and the hard tooth-like projections on the edges of the stipe near the base.

3. **A. angustum** (Willd.) Presl. (*Asplenium Filix-foemina* of authors.) LADY FERN.

Low woods and fields, bogs, and swales, in mucky or gravelly neutral or acid soils; common. July–Sept.

Newf. to N. Dak., southw. to Pa., Ill., and Mo., including the northern Coastal Plain.

The fronds are very variable, but the variations are apparently ecological. The typical form and the var. *elatius* (Link) Butters seem to be sun forms, whereas a broader and less dimorphic shade form is var. *rubellum* (Gilb.) Butters. (See Rhodora **19**: 169. 1917.)

9. Camptosorus Link

1. **C. rhizophyllus** (L.) Link. WALKING LEAF FERN.

Shaded ledges on calcareous cliffs in ravines; frequent. July–Sept.

Enfield Glen; ravine n. of Lick Brook; Buttermilk Glen; Old Buttermilk Ravine; Six Mile Creek (*D.* in C. U. Herb.!); Cascadilla Glen; Fall Creek, at Beebe Lake and suspension bridge; ledges at s. w. corner of Cayuga Lake and small ravines near by; Taughannock Gorge; Shurger Glen; Paine Creek; probably in other ravines. A small quantity in each place.

Cent. Me. to Ottawa and Minn., southw. to Ga. and Kans.; rare or absent on the Coastal Plain.

10. Asplenium L.

a. Fronds 8–22 cm. long; pinnae small, 3–8 mm. long, orbicular or short-oblong, not auricled. 1. *A. Trichomanes*

a. Fronds 20–50 cm. long; pinnae oblong-linear, larger, 10–35 mm. long, auricled on one or both sides. 2. *A. platyneuron*

1. **A. Trichomanes** L. MAIDENHAIR SPLEENWORT.

Dry or damp shaded ledges, on calcareous rocks in ravines; common. June–Oct.

Common in nearly all the ravines of the basin, and occasionally found along the lake cliffs.

Nearly throughout N. A. except in the extreme North and in Mex.; rare or absent on the Atlantic Coastal Plain. Found also in Eurasia.

2. **A. platyneuron** (L.) Oakes. (*A. ebeneum* Ait.) EBONY SPLEENWORT.

Dry rocky and sandy open woods, in calcareous or subacid soils; infrequent. June 25–Aug.

Enfield Glen; Coy Glen; terrace, n. slope of South Hill; cemetery, University Ave., Ithaca; Fall Creek (*D.* in C. U. Herb.); e. shore of Cayuga Lake, near Esty Glen; woods near Mud Creek Swamp; and probably elsewhere.

S. Me. to Ont. and Colo., southw. to the Gulf States and Tex., including the Coastal Plain.

11. Woodwardia Sm.

1. **W. virginica** (L.) Sm. CHAIN FERN.

Moor of acid peat bogs, mostly in sandy regions; rare. Aug.–Sept.

Woodwardia Bog (*D.* in C. U. Herb.!); moor of peat bogs, Junius; n. e. end of Duck Lake.

N. S. to Fla., La., and Ark., chiefly along the coast; also inland in the Great Lakes region.

Sterile specimens of this species resemble those of Osmunda, Thelypteris, and Athyrium, from which they may be distinguished by the fronds being scattered and by the presence of areolae in the venation along the midrib. The numerous bundles in the lower part of the stipe also serve to distinguish this genus from Osmunda.

12. **Pellaea** Link

1. **P. atropurpurea** (L.) Link. CLIFF BRAKE.

Crevices and ledges on the face of dry exposed calcareous cliffs; rare. Aug.–Sept.

Enfield Glen, near the crest of the high cliffs (*A. J. E. & L. F. Randolph*); Fall Creek (*V. McCoy* in C. U. Herb.); Esty Glen (*A. H. Wright*); ravine n. of Esty Glen (*D.* in C. U. Herb.); on cliffs along the eastern shore of the lake; n. side of Moore Creek just e. of Ludlowville village, near the large falls (*A. Gershoy*); Taughannock Gorge, s. side, near the lower end.

"N. H." and Vt. to Mackenzie and B. C., southw. to R. I., Ga., Miss., Tex., and Calif., also in northern Mexico; rare or absent on the Atlantic Coastal Plain.

13. **Cryptogramma** R. Br.

1. **C. Stelleri** (Gmel.) Prantl. (*Pellaea gracilis* Hook.) ROCK BRAKE.

Dry shaded ledges in ravines, in calcareous soils; rare. June 25–July.

Enfield Glen, above Lucifer Falls (*D.* in C. U. Herb.!); Fall Creek (*D.* in C. U. Herb.), opposite the old mill in Forest Home (*Mrs. A. E. J. Webster*) and back of Prudence Risley Hall (*K. M. W.*).

Lab. to Alaska, southw. to Vt., Conn., N. Y., n. Pa., Ill., Wis., and Colo.; apparently absent on the Atlantic Coastal Plain. Found also in Asia.

14. **Adiantum** (Tourn.) L.

1. **A. pedatum** L. MAIDENHAIR.

Rich damp woodlands, in deep humus over calcareous gravels or loams; frequent. July–Aug.

In most of the larger ravines of the basin, as Enfield, Six Mile Creek, Coy Glen, and Salmon Creek; also in woods in the McLean district.

Newf. to Alaska, southw. to Ga., La., and Kans., and in the Rocky Mts. to Utah and Calif.; rare on the Atlantic Coastal Plain. Found also in Asia.

15. **Pteridium** Scop.

1. **P. latiusculum** (Desv.) Maxon. (*Pteris aquilina* of Gray's Man., ed. 7.) COMMON BRAKE.

Dry sandy or gravelly banks and borders of woods, mostly in acid soils; frequent, and locally abundant. Aug. 25–Sept.

Hills of Spencer, Danby, and Caroline; about the crests of most of the ravines of the basin; s. w. shore of Cayuga Lake; near Malloryville Bog; and elsewhere.

Newf. to Wis. and Wyo., southw. to D. C., W. Va., Ill., and Ariz., including the Coastal Plain.

16. **Polypodium** (Tourn.) L.

1. **P. virginianum** L. (See Rhodora **24** : 125. 1922. *P. vulgare* of Amer. authors.) POLYPODY.

Dry shaded ledges and crests in ravines, in calcareous or somewhat acid soils; common. July 15–Aug.

Lab. and Newf. to Man., southw. to Ga., Ala., and Mo., including the Coastal Plain.

2. **OSMUNDACEAE** (FLOWERING FERN FAMILY)

1. **Osmunda** (Tourn.) L.

a. Fronds fertile at the tip, 2-pinnate. 1. *O. regalis*, var. *spectabilis*
a. Fronds fertile in the middle, 1-pinnate. 2. *O. Claytoniana*
a. Fronds wholly dimorphic, the fertile and sterile ones separate, the latter 1-pinnate. 3. *O. cinnamomea*

1. **O. regalis** L., var. **spectabilis** (Willd.) Gray. (See *Rhodora* **21**:176. 1919.) FLOWERING FERN. ROYAL FERN.

Mucky borders of swamps, in acid soil though in both acid and somewhat calcareous regions; frequent. May 20–June.

Pond near Enfield Falls; s. of Caroline Depot; n. w. of Brookton; South Hill Marsh; Renwick Marshes (*D.* in C. U. Herb.!); Warren woodlot n. of Forest Home; Ellis Hollow; Malloryville Bog; McLean Bogs; Lake Como; n. of Montezuma village; *Montezuma Marshes; Junius ponds; Featherbed Bog.*

Newf. to Sask., southw. to Fla., Miss., and Nebr., including the Coastal Plain. Found also in tropical Am.

2. **O. Claytoniana** L. INTERRUPTED FERN.

In damp fields or woods, in rich, often alluvial, neutral or somewhat acid, soils; frequent, especially on the hills s. of Ithaca. May 20–June 20.

North Spencer; Michigan Hollow; Inlet Valley, Newfield; Enfield Glen; Fall Creek (*D.* in C. U. Herb.), above Forest Home; Turkey Hill; Mud Creek, Freeville; McLean Bogs; Beaver Brook; and elsewhere.

Newf. to Minn., southw. to N. C., Ky., and Mo., including the Coastal Plain. Found also in s. Asia.

3. **O. cinnamomea** L. CINNAMON FERN.

Mucky swamps, in acid soils, most abundant about peat bogs; common in such situations. May 20–June.

Newf. to Minn., southw. to Fla., La., and N. Mex., including the Coastal Plain. Found also in Mex., S. A., W. I., and Eurasia.

Sterile fronds of *Osmunda Claytoniana* and *O. cinnamomea* resemble those of Woodwardia and Thelypteris (see Woodwardia). These species of Osmunda may be distinguished from the species of Thelypteris which they resemble, by the absence of scales on the stipe and by the single large curved bundle in the stipe with inrolled edges. Sterile fronds of *O. cinnamomea* have tufts of wool at the base of the pinnae and the stipe is 2-ridged throughout. In *O. Claytoniana* the wool is absent and the stipe is ridged only toward the summit.

3. SALVINIACEAE (SALVINIA FAMILY)

1. Azolla Lam.

1. **A. caroliniana** Willd.

Quiet waters; very rare.

"Cayuga Marshes, at the foot of Cayuga Lake," *1879* (*D.* in C. U. Herb.); not seen in recent years.

Ont. and Mass. (?) to B. C., southw. to Fla. and Mex. Found also in tropical Am.

4. MARSILEACEAE (WATER CLOVER FAMILY)

1. Marsilea L.

1. **M.** QUADRIFOLIA L. WATER CLOVER. PEPPERWORT.

Slow-flowing, calcareous or neutral, waters; locally abundant. Sept.–Nov.

Eddy Pond, formerly (site of the Girls' Playground, Cascadilla Glen); in Fall Creek, near its mouth and along Renwick Beach; also on various points along the lake shore to Union Springs. Said to have been introduced by the early local botanists.

Native of Eurasia.

5. OPHIOGLOSSACEAE (ADDER'S TONGUE FAMILY)

a. Veins reticulated; sterile segments entire; sporangia coherent in a simple spike. 1. OPHIOGLOSSUM

a. Veins free; sterile segments deeply lobed, pinnate, ternate, or even twice compound; sporangia separate, in panicles, rarely in a simple spike. 2. BOTRYCHIUM

1. Ophioglossum (Tourn.) L.

1. **O. vulgatum** L. ADDER'S TONGUE FERN.

Damp sterile turfy acid (?) pasture land over gravels, and borders of swamps; rare. June 15–July.

Around Headwaters Swamp, 1924 (*A. M. VanDeman*); w. end of Mud Creek Swamp (*W. C. Muenscher*); McLean, "near McLean Bogs" (*D.* in C. U. Herb.) and between the railroad and Mud Pond (*E. E. Barker*); one mile e. of East Lansing (*A. A. Wright*); meadow, Montezuma.

P. E. I. to Ont., southw. to Fla., including the Coastal Plain. Found also in Eurasia.

2. Botrychium Sw.

a. Fronds small or of medium size, 5–15 (25) cm. tall; sheathing base of stalk completely closed around the bud; sterile part of frond fleshy.
- b. Sterile part of frond sessile or short-stalked, inserted at various heights, small, pinnate, rarely simple, its segments crenate or entire, obtuse.
  - c. Segments of the sterile part obovate.
    - d. Veins forking repeatedly; sterile part of frond pinnatifid, bent over at apex in the bud, inserted toward summit of plant. 1. *B. Lunaria*, var. *onondagense*
    - d. Veins forking from base of lobes; fronds smaller, the sterile part little divided, erect in the bud, inserted at base of plant. [*B. simplex*]
  - c. Segments of the sterile part oblong, often crenate at apex; veins repeatedly forking; sterile part inserted toward summit of plant. 2. *B. matricariaefolium*
- b. Sterile part sessile near the summit of the plant, subternate, its ultimate segments narrow, acutish (see also 3d b). 3. *B. angustisegmentum*
- b. Sterile part long-stalked, inserted near the base of the plant, ternately decompound.
  - c. Ultimate segments ovate-oblong, acutish. 4. *B. dissectum*
  - c. Ultimate segments ovate or obvate, obtuse or rounded, tending toward flabelliform. 5. *B. ternatum*, var. *intermedium*

a. Fronds large, 30–60 cm. tall; sheathing base of stalk covering the bud but open down one side; sterile part of frond sessile just above the middle of the plant, membranous. 6. *B. virginianum*

1. **B. Lunaria** (L.) Sw., var. **onondagense** (Underw.) House. (See Bul. N. Y. State Mus. 254:13. 1924.)

Danby, 1882 (*F. C. Curtice* and *W. R. Dudley*, in C. U. Herb.).

Known previously only from Onondaga Co., N. Y.

The Danby specimens are well developed and answer very well to the descriptions and figures of this variety. No other disposition of them seems possible.

[**B. simplex** E. Hitchc.

Reported from Danby by *Dudley* (see Peck, Rept. N. Y. State Bot. **36**:40. 1884), but the Dudley specimens in the C. U. Herb. from that locality are *B. Lunaria*, var. *onondagense*; also reported from Botrychium Woods, Spring Lake (*L. Griscom, F. P. Metcalf, & A. H. Wright*, see Rhodora **19**:33. 1917), but these specimens are *B. matricariaefolium*.]

2. **B. matricariaefolium** A. Br. (*B. ramosum* (Roth) Asch. See Schinz, Vierteljahresschrift Naturf. Gesell. Zürich, **61**: 416. 1916.) GRAPE FERN.

Grassy open woodlands, in gravelly soil; frequent. June 15–July.

North Spencer, hill n. w. of station; Bull Hill, Newfield; Six Mile Creek; Ringwood; Freeville Bog; McLean Woods; Malloryville Bog (*D.* in C. U. Herb.); near Townley Swamp and near Wyckoff Swamp; near Turtle Pond; rich woods, Featherbed Bog; Botrychium Woods, Spring Lake.

E. Que. and N. S. to S. Dak., southw. to Md. and Nebr.; less frequent on the Coastal Plain. Found also in Wash. and in Eu.

3. **B. angustisegmentum** (Pease & Moore) Fernald. (See Rhodora **17**: 87. 1915. *B. lanceolatum* of authors.) GRAPE FERN.

In situations similar to those of the last-named species, and often growing with it; frequent. July.

The narrows between Slaterville and Caroline Center; hill s. w. of West Danby; Danby (*D.* in C. U. Herb.); s. e. of Etna; McLean Woods; Townley Swamp; Botrychium Woods, Spring Lake; near Featherbed Bog.

N. S. to Alaska, southw. to N. J., Ohio, Colo., and Wash.; rare on the Atlantic Coastal Plain. Found also in Eurasia.

4. **B. dissectum** Spreng. (See Rhodora **23**: 151. 1921.) GRAPE FERN.

Damp or dry turf and moss in old pastures, over neutral or acid gravels; frequent. Aug 15–Sept.

Spencer Lake; Ellis Hollow; e. of Freeville and n. of McLean (*D.* in C. U. Herb.); Townley Swamp; near Junius marl ponds; e. of Featherbed Bog; Botrychium Woods, Spring Lake.

N. B. and N. S. to Minn., southw. to Fla., Mo., Ark., and Mex., including the Atlantic Coastal Plain.

A form with the segments of the frond merely crenate is forma *obliquum* (Muhl.) Fernald (see Rhodora **23**: 151. 1921). It has been found, often with the typical form, at the following localities: hills of West Danby; n. w. of Spencer Lake; hills of Brookton; Enfield Glen; Richford; Ringwood; McLean region; Beaver Brook; Townley Swamp; Botrychium Woods, Spring Lake.

5. **B. ternatum** (Thunb.) Sw., var. **intermedium** D. C. Eaton.

In situations similar to those of the last-named species and growing with it, perhaps more often in sandy soils; rare.

Botrychium Woods, Spring Lake (*F. P. Metcalf & A. H. Wright*).

N. N. E. to B. C., southw. to Mass., N. Y., and Oreg.

6. **B. virginianum** (L.) Sw. RATTLESNAKE FERN. GRAPE FERN.

Dry or moist gravelly or sandy, often alluvial, woodlands, with little reference to lime content of the soil; frequent, and widely distributed. May 20–June.

Lab. to B. C., southw. to Fla., La., Ariz., and Wash., including the Atlantic Coastal Plain, where it is common. Found also in Mex., W. I., and Eurasia.

6. EQUISETACEAE (HORSETAIL FAMILY)

1. Equisetum (Tourn.) L.

a. Stems annual, mostly soft and pliant, at least the sterile ones usually with whorls of branches and excurrent; spikes blunt.
  b. Sheaths on the main stem with 8–12 teeth; central cavity of stem 1/6 to 2/3 diam. of stem; stem with prominent vallecular canals.
    c. Stems dimorphic, the early ones fertile, succulent, brown or flesh-colored, the *later ones much branched and greener.*

d. Teeth on the main stem black, moderately firm, scarcely cohering; fertile stems unbranched (except in one form), soon perishing; sterile stems obscurely excurrent, the branches ascending, subsimple, rather straight; silica in scattered dots. 1. *E. arvense*

d. Teeth on the main stem light brown, subscarious, cohering in broad lobes; fertile stems at length sparingly branched and persisting; sterile stems strongly excurrent, the branches fine, irregular, drooping, branched; silica in two rows of hooked spicules. 2. *E. sylvaticum*, var. *pauciramosum*

c. Stems practically alike, branched, excurrent, green; silica in tiny transverse ridges; sheaths of the stem rather loose, with black scarious-margined teeth; branches strongly ascending, straight, subsimple. 3. *E. palustre*

b. Sheaths on the main stem with 15–20 firm dark persistent teeth, close; stems practically alike, green, reed-like, branched or simple; central cavity 4/5 diam. of stem; vallecular canals small or lacking; silica in tiny transverse ridges; branches mostly near the middle of the stem, strongly ascending, subsimple, of varying thickness. 4. *E. limosum*

a. Stems* perennial, all alike, stiff and harsh, normally unbranched or irregularly branched near the base; spikes apiculate.

b. Stems tall, reed-like, hollow, many-grooved, 3–7 mm. in diam.; sheaths many-toothed, the teeth soon deciduous. 5. *E. hyemale*, var. *affine*

b. Stems low, solid, very slender, 6-grooved, tufted and flexuous, about 0.5 mm. in diam.; sheaths mostly 3-toothed. 6. *E. scirpoides*

1. **E. arvense** L. COMMON HORSETAIL.

Moist or rather dry sandy or gravelly soils lacking in humus, also found frequently in clay, in open places especially along embankments; common. Apr.–May 15.

Newf. to Alaska, southw. to N. C. and Calif., including the Atlantic Coastal Plain. Found also in Eurasia.

The forma *decumbens* (Meyer) Luers. (see Fern Bul. **7**:86. 1899), with the fertile stems bearing persistent green branches as on sterile stems, was found in the bog at Lake Como (*W. C. Muenscher & R. S. Nanz*).

2. **E. sylvaticum** L., var. **pauciramosum** Milde. WOOD HORSETAIL.

Boggy meadow land and swampy woods, on gravelly, neutral, often alluvial, soils; frequent. May–June 10.

Hilltop n. w. of North Spencer; near headwaters of Dry Run; s. w. of Key Hill; Michigan Hollow Swamp; Warren woodlot, Fall Creek; Ellis Hollow, in alluvial soil; Freeville Bog (*D.* in C. U. Herb.!); Mud Creek, Freeville; McLean Bogs.

Newf. to Alaska, southw. to Va., Ohio, and Iowa, including the northern Atlantic Coastal Plain. Found also in Eurasia.

All the material seen from the Cayuga Lake Basin is forma *multiramosum* Fernald (Rhodora **20**:131. 1918).

3. **E. palustre** L.

Marl bogs and springs; rare. July.

Larch Meadow, 1922 (*W. E. Manning*!).

Newf. to Alaska, southw. to Conn., N. Y., Ill., and Wash.; rare or absent on the Atlantic Coastal Plain. Found also in Eurasia.

4. **E. limosum** L. (See Rhodora **23**:43. 1921. *E. fluviatile* of Gray's Man., ed. 7.) PIPES.

Swales and mud banks, in calcareous or neutral soils; frequent. May 25–June.

Inlet Marshes (*D.* in C. U. Herb.!); Cascadilla Creek, toward Ellis Hollow; Renwick flats; pond at Mecklenburg; swale w. of Jacksonville; e. of Montezuma; on the quaking moor of Vandemark Pond; and elsewhere.

Newf. to Alaska, southw. to Va., Nebr., and Oreg.; less common on the Atlantic Coastal Plain. Found also in Eurasia.

5. **E. hyemale** L., var. **affine** (Engelm.) A. A. Eaton. (See Schaffner, Amer. Fern Journ. 11:65. 1921. *E. praealtum* Raf., *E. hyemale*, var. *robustum* (A. Br.) A. A. Eaton.) SCOURING RUSH.

Springy or dry sandy open or shaded banks, in noncalcareous, often alluvial, soils; frequent. May–Sept.

Danby, near Fir Tree Swamp; near mouth of Enfield Glen; near Buttermilk Glen; Six Mile Creek (*D.* in C. U. Herb.!); South Ave., Ithaca; McLean; railroad n. of Esty Glen; Taughannock; sandy lake shore n. of Levanna; 'Howland Point; sandy field, Junius.

Canada to Mex.; more common e. of the Mississippi River, but infrequent on the Atlantic Coastal Plain.

The European species, *E. hyemale* L., and the American variety, *affine*, do not seem distinct enough to be recognized as separate species, as they are by some authors.

6. **E. scirpoides** Michx.

Stream banks and hummocks in low, mostly coniferous, woods, on gravelly soils; scarce. May–Sept.

Ravine n. of Buttermilk Glen; Six Mile Creek, in runs near Potter Falls; Mud Creek Swamp; woods along Beaver Brook.

Lab. to Alaska, southw. to Pa., Ill., and B. C.; rare or absent on the Atlantic Coastal Plain. Found also in Eurasia.

7. LYCOPODIACEAE (CLUB-MOSS FAMILY)

1. Lycopodium L.

a. Sporangia borne in the axils of the normal foliage leaves; stems not extensively creeping, forked. 1. *L. lucidulum*
a. Sporangia borne in terminal spikes; stems often long-creeping, variously branched.
  b. Sporophylls green and leaf-like; stems julaceous. 2. *L. inundatum*
  b. Sporophylls yellowish, much modified, scale-like.
    c. Branches not fan-shaped nor fastigiately branched, julaceous, the slender leaves radiating in all directions.
      d. Spike solitary, sessile; leaves more or less reflexed, not bristle-tipped.
        e. Leaves serrate, thin, rather broad. 3. *L. annotinum*
        e. Leaves entire or obscurely serrate, firm, narrow. 3a. *L. a.*, var. *acrifolium*
      d. Spikes 1–several, the cluster peduncled; leaves ascending, bristle-tipped. 4. *L. clavatum*
    c. Branches fan-shaped or fastigiately branched.
      d. Spikes sessile; leaves 3–5 mm. long. 5. *L. obscurum*
      d. Spikes clustered on a long common peduncle; leaves strongly decurrent, the free part of the lateral leaves 0.5–2 mm. long, that of the dorsal and ventral leaves smaller; branches flattened.
        e. Branchlets (1.5) 2–3 mm. wide, yellowish green; horizontal stems on or near the surface of the ground. 6. *L. complanatum*, var. *flabelliforme*
        e. Branchlets 1–1.75 (2) mm. wide, bluish green, more fastigiate; horizontal stems rather deeply buried in the ground. 7. *L. tristachyum*

1. **L. lucidulum** Michx.

Deep damp gravelly or sandy woodlands, mostly under hemlocks, in deep humus over nearly neutral soils; frequent. Aug.–Sept.

West Danby; s. of Key Hill; Coy Glen; Six Mile Creek (*F. B. Hine* in C. U. Herb.!); Caroline hills; e. of Slaterville; Richford; Ringwood; McLean Bogs; Shurger Glen; around the Junius peat bogs; Duck Lake.

Newf. to B. C., southw. to N. E., N. Y., Ind., Iowa, and Wash., and in the mts. to S. C.; infrequent on the Atlantic Coastal Plain.

2. **L. inundatum** L.

Acid moors of peat bogs in sandy regions; rare. July–Aug.

Freeville Bog, 1876 (*F. B. Hine* in C. U. Herb.); Junius peat bogs, first collected in 1894 (*K. M. W.*).

Newf. to Alaska, southw. to N. J., Pa., Ill., Mich., Idaho, and Wash., including the Atlantic Coastal Plain. Found also in Eurasia.

3. **L. annotinum** L.

Low or rather dry woods, with humus on gravelly noncalcareous soils; rare. Aug.–Sept.

Rich woods along a stream in the hills w. of Spencer Lake (*A. J. E. & L. H. MacDaniels*).

Newf. to Alaska, southw. to Conn., N. Y., Mich., Wis., Colo., Idaho, and Wash.; infrequent on the Atlantic Coastal Plain.

3a. **L. annotinum** L., var. **acrifolium** Fernald. (See Rhodora 17: 123. 1915.)

In situations similar to the preceding but usually more exposed; rare, but more frequent than the species itself. Aug.–Sept.

Newfield, near Key Hill swamp; McLean Bogs (*D.* in C. U. Herb., also *A. J. E. & L. H. MacDaniels*). [Also, n. e. corner of Van Etten, *A. J. E. & L. H. MacDaniels*.]

Newf. to Mich., southw. to Pa. Found also in Siberia.

4. **L. clavatum** L. CLUB-MOSS.

Dry sterile grassy banks and dry open woods, on sandy or gravelly noncalcareous soils; infrequent. Aug. 15–Sept.

Hills of Spencer, Danby, and Newfield; Richford; Ringwood (*D.* in C. U. Herb.!); McLean Bogs; Wyckoff and Townley Swamps.

Lab. to Alaska, southw. to N. C., Mich., and Wash., including the northern Atlantic Coastal Plain. Found also in Eurasia and tropical Am.

Spores of this and other species are inflammable and were formerly much used in photography and stage effects.

5. **L. obscurum** L. CLUB-MOSS.

Dry sterile banks and open woods, on gravelly or sandy noncalcareous soils; infrequent. Sept.–Nov.

Hilltops, s. e. corner of Newfield; s. of Caroline Depot; hillside s. of Brookton; Richford; Ellis Hollow (*D.* in C. U. Herb.); Ringwood; McLean Bogs; near Townley Swamp; Spring Lake.

Newf. to Alaska, southw. to N. C. and Ind., including the northern Atlantic Coastal Plain.

No typical plants of var. *dendroideum* (Michx.) D. C. Eaton have been found within the limits of the Cayuga Lake Basin, but occasional transitional plants occur.

6. **L. complanatum** L., var. **flabelliforme** Fernald. CLUB-MOSS.

In situations similar to the preceding; frequent. Sept.–Oct.

Enfield Glen (*D.* in C. U. Herb.); North Spencer, s. of station; e. of Caroline Depot; Michigan Hollow; Richford hills; hilltops of Caroline (*D.* in C. U. Herb.!), Danby, Newfield, and Dryden; Ringwood; McLean Woods; Lake Como; Wyckoff Swamp; Spring Lake; Junius. A specimen from Duck Lake (*F. P. Metcalf, A. H. Wright, & A. J. E.*) resembles typical *L. complanatum* L., but it may be only a shade form.

Newf. to Minn., southw. to N. C., Ky., and Idaho; occasional on the Coastal Plain.

This may be a distinct species. (See Rhodora 13: 168. 1911.)

7. **L. tristachyum** Pursh. CLUB-MOSS.

Habitat similar to that of the last preceding species; rare. Aug.

Hilltops of Van Etten, Spencer, Danby, Caroline, and Newfield (*A. J. E., K. M. W., L. H. MacDaniels, & L. F. Randolph*); locally abundant in the s. e. corner of Newfield and 1½ miles n. of Caroline Center; woods along Beaver Brook and McLean Bogs (*W. C. Muenscher*).

Newf. to Lake Superior, southw. to Del. and in the mts. to Ga.; infrequent on the Coastal Plain. Found also in Eu.

8. SELAGINELLACEAE (SELAGINELLA FAMILY)

1. Selaginella Beauv.

1. **S. rupestris** (L.) Spring.

Dry exposed cliff crests, in noncalcareous sterile soils; rare. Sept.–Oct.

Taughannock Gorge, n. side above the falls (*D.* in C. U. Herb.!), still persisting in this restricted area.

N. S. and Ont. to the Pacific coast, southw. to Ga. and Mo., but apparently rare on the coastal plain of N. E. Found also in Eurasia.

[**S. apoda** (L.) Fernald. (See Rhodora 17: 68. 1915.)

Not yet found within the limits of this flora, but occurring on low grassy soils over marl on the borders of Green Lake, Preble, Cortland Co.]

9. ISOËTACEAE (QUILLWORT FAMILY)

1. Isoëtes L.

a. Megaspores with slender jagged spines; low plants, usually submerged. 1. *I. echinospora*, var. *Braunii*

a. Megaspores alveolate; plants taller, 1–4 dm. high, usually emersed. 2. *I. Engelmanni*

1. **I. echinospora** Dur., var. **Braunii** (Dur.) Engelm. QUILLWORT.

Sandy lake bottoms, in shallow waters; rare. July–Sept.

Cayuta Lake, w. shore (*D.* in C. U. Herb.); Duck Lake (*K. M. W., A. J. E., & F. P. Metcalf*).

Newf. to B. C., southw. to Pa. and Calif., including the Atlantic Coastal Plain.

2. **I. Engelmanni** A. Br. QUILLWORT.

Marly mud, usually emersed but submerged in spring and during seasons of high water; rare. July–Sept.

Small pocket along w. edge of Cortland marl pond region, also about a small pond s. w. of Chicago Bog (*D.* in C. U. Herb.!); Lake Como (Locke Pond, *D.* in C. U. Herb., 1881).

N. H. and Vt. to Pa., Ill., and Mo.; rare or absent on the Coastal Plain.

DIVISION II. SPERMATOPHYTA

SUBDIVISION I. GYMNOSPERMAE

10. TAXACEAE (YEW FAMILY)

1. Taxus (Tourn.) L.

. **T. canadensis** Marsh. GROUND HEMLOCK. AMERICAN YEW.

• Shaded ravine banks and borders of deep swamps, on gravelly or shaly, mostly eutral, soils in the humus of conifers; frequent. Apr. 20–May 10.

In nearly all the ravines of the basin. Some swamp stations are: s. of Caroline)epot; Michigan Hollow Swamp (*D.*!); Larch Meadow; Ellis Hollow Swamp *D.*!); Bear Swamp (*D.*); McLean Woods; Beaver Brook.

Newf. to Man., southw. to Va. and Iowa; rare or absent on the Coastal Plain.

11. PINACEAE (PINE FAMILY)

. *Leaves clustered or alternate, narrowly linear or acicular; fruit a dry cone.*
 b. Leaves except on leader shoots in bundles of 2 or more.
  c. Leaves in 2's, 3's, or 5's, 7–18 cm. long, needle-like, evergreen. 1. PINUS
  c. Leaves many in each cluster, 4 cm. long or less, deciduous. 2. LARIX
 b. Leaves scattered, alternate.
  c. Leaves 4-angled; leaf scars raised on short pedicel-like projections; buds not coated with resin; cones pendent, falling entire. 3. PICEA
  c. Leaves flat; leaf scars not raised on pedicel-like projections.
   d. Buds not coated with resin, very small; leaf scars at an angle with the twig; leaves petiolate, 8–15 mm. long; cones pendent, falling entire. 4. TSUGA
   d. Buds coated with resin; leaf scars even with the surface of the twig; leaves sessile, 15–25 mm. long; cones erect, with persistent axis and deciduous scales. 5. ABIES
ı. Leaves opposite or whorled, scale-like or subulate; fruit a dry or a berry-like cone.
 b. Spray of branchlets flat; dorsal and ventral leaves differing from the lateral leaves, all scale-like; cone dry, its scales opposite. 6. THUJA
 b. Spray of branchlets not flat; leaves nearly similar, scale-like or subulate-acicular; cone scales fused, somewhat fleshy, forming a blue berry. 7. JUNIPERUS

1. Pinus (Tourn.) L.

ı. Leaves 5 in each cluster; cones 10–15 cm. long, subcylindrical; scales thin, without spiny tips. 1. *P. Strobus*
ı. Leaves 2 or 3 in each cluster; cones 3–9 cm. long, ovoid; scales woody, thickened at the apex.
 b. Leaves in 3's, yellow-green; cone scales with stiff recurved prickles. 2. *P. rigida*
 b. Leaves in 2's, deep rich green; cone scales without prickles. 3. *P. resinosa*

.. **P. Strobus** L. WHITE PINE.

Hills, or even swamps, on sandy or gravelly noncalcareous soils; preferring more oamy and less acid soils than the next species; formerly abundant, still common. fune.

. "Once the principal forest tree over large areas in this vicinity" (*D.*). This is :specially true on the Volusia and Lordstown soils south and east of Ithaca, where he stump fences still give evidence of the abundance of this species and serve also ıs an indicator of its previous distribution. The tract of first-growth trees mentioned ›y Dudley as "Signer's Woods" was lumbered about fifteen years ago. First-growth rees still exist on West Hill (Riley farm) and east of the Caroline Pinnacles.

Newf. to Man., southw. to Pa. and e. Iowa, and along the mts. to Ga.; infrequent on the Coastal Plain.

2. **P. rigida** *Mill.* PITCH PINE.

Dry hills and ravine crests, in sandy or stony sterile acid soils; frequent.

Widely scattered about the crests of the ravines of the basin, on the high hills s. of Ithaca, along the lake cliffs, and on the sands n. of the lake; rare or absent in the McLean district.

N. B. to s. w. Ont., southw. to Ga., Ala. Tenn., and Ohio; common in the pine barrens of e. N. E., L. I., and N. J.

3. **P. resinosa** Ait. RED PINE.

Habitat similar to the preceding, but preferring slightly heavier soils; infrequent. *May 25–June.*

"Abundant on the high ridge east of W. Danby" (*D.*!); "the largest groups are on the declivities between White Church and Brookton" (*D.*); Connecticut Hill; "high bank north of Lucifer Falls" (*D.*!); mouth of Coy Glen (*D.*); Six Mile Creek, n. bank below Wells Falls and on the promontory e. of the Sulphur Spring (*D.*!); n. bank of Buttermilk Glen (*D.*!); "east shore of Cayuga Lake, from McKinney's to Ludlowville" (*D.*!); "wanting on the west shore except at Taughannock and Trumansburg ravines" (*D.*); absent from the McLean district.

Newf. to Man., southw. to Mass., Pa., and Wis.; rare or absent on the Coastal Plain.

2. Larix (Tourn.) Adans.

a. Leaves 15–28 mm. long; cones 12–20 mm. long; cone scales glabrous. 1. *L. laricina*

a. Leaves 20–40 mm. long; cones 20–30 mm. long; cone scales puberulent. [*L. decidua*]

1. **L. laricina** (DuRoi) Koch. (*L. americana* of Cayuga Fl.) LARCH. TAMARACK.

About bogs, on the acid peat moors but more abundant on marl moors; infrequent. May 1–15.

Fir Tree Swamp, Danby (D.!); Michigan Hollow Swamp (D.!); marly soil, Larch Meadow (*D.*!); Freeville (*D.*); in marl, Mud Creek, Freeville (*D.*!); Woodwardia Bog (*D.*!); Junius peat bogs (*D.*!); near the Junius marl ponds (*D.*!); Crusoe Prairie; Duck Lake.

Lab. and Newf. to N. W. Terr., southw. to N. J., n. Pa., n. Ill., and cent. Minn.; rare or absent on the Coastal Plain.

[**L.** DECIDUA Mill. EUROPEAN LARCH.

Frequently planted and occasionally appearing in wild places, but probably not permanent.

Native of Eu.]

3. Picea Link

a. Leaves blunt, 5–15 mm. long; twigs all spreading; cones ovate, 2–3 cm. long. 1. *P. mariana*

a. Leaves acute, 12–25 mm. long; lateral twigs drooping; cones cylindrical, 10–15 cm. long. [*P. Abies*]

1. **P. mariana** (Mill.) BSP. (*P. nigra* of Cayuga Fl.) BLACK SPRUCE.

Peat bogs, in acid soil; rare. May.

Spruce Swamp, Enfield (*D.*!), now almost extinct; Woodwardia Bog (*D.*!); Junius peat bogs; Crusoe Prairie; Duck Lake.

Lab. to N. W. Terr., southw. to N. J., Mich., and Minn., and along the mts. to N. C.; rare or absent on the Coastal Plain.

[**P. Abies** (L.) Karst. (*P. excelsa* Link.) NORWAY SPRUCE

Found occasionally in wild places, but probably not established, common in cultivation.

Native of Eu.]

4. Tsuga (Endl.) Carr.

1. **T. canadensis** (L.) Carr. HEMLOCK.

Shaded slopes, especially in ravines and on the higher hills but also in swamps, in gravelly or shaly soils with little reference to lime content; common. June.

Formerly an important forest tree in this region, but now mostly lumbered, distribution general.

N. S. and N. B. to Minn., southw. to Del., Mich., and Wis., and in the mts. to Ga. and Ala.; rarely found on the Coastal Plain.

5. Abies (Tourn.) Hill

1. **A. balsamea** (L.) Mill. BALSAM FIR.

Boggy places, in acid or sometimes apparently calcareous soils; scarce. May.

Michigan Hollow Swamp; Fir Tree Swamp, Danby (*D.*!); Key Hill swamp; swamp between Slaterville and Dryden Lake; Fir Tree Swamp, Freeville, near the railroad (*D.*!); *near the mouth of Mud Creek, Freeville, formerly* (*D.*); *upper* Beaver Brook.

Newf. and Lab. to Hudson Bay and Alberta, southw. to Mass. and Iowa, and along the mts. to Va.; apparently infrequent on the Coastal Plain.

6. Thuja L.

1. **T. occidentalis** L. ARBOR VITAE. WHITE CEDAR.

Boggy, more or less calcareous, soils; scarce. Apr. 25–May 20.

"A half mile northwest of Black Lake, in a swamp north of Lay's Iron Spring,—a large number" (*D.*); on moor of Junius marl ponds (*D.*!); occasional in the towns of Conquest and Montezuma; bog s. w. of Westbury, in the town of Butler; Crusoe Lake. In the Cayuga Lake Basin, confined entirely to the Ontario plain.

E. Que. to Man., southw. to Pa., Tenn., Ill., and Minn., and in the mts. to N. C.; apparently absent on the Coastal Plain.

7. Juniperus (Tourn.) L.

a. Leaves whorled, subulate-acicular, sharp-pointed, 8–14 mm. long; plant low, decumbent. 1. *J. communis*, var. *depressa*

a. Leaves opposite, scale-like, 0.5–1.5 mm. long, less sharp (in juvenile plants acicular); plant erect, arborescent. 2. *J. virginiana*

1. **J. communis** L., var. **depressa** Pursh. (*J. communis* of Cayuga Fl.) JUNIPER.

Dry sterile stony hillsides, in light noncalcareous soils; rare. May 1–15.

"Three stations are known: In a pasture west of Eagle Hill; South Hill, north of S. S. 420; W. Danby, near the western base of Thacher's Pinnacle, (*F. V. Coville.*)" (*D.*). Two other stations have since been found: n. slope of South Hill, *farther toward Caroline* (*A. H. Wright*); *and crest of ravine n. of* Esty Glen.

N. S. to Conn. and N. Y., along the Great Lakes, and northwestw., including the northern Coastal Plain.

2. **J. virginiana** L. RED CEDAR.

Dry hillsides and rocky banks, in gravelly or sandy noncalcareous soils; locally common. Apr. 15–30.

About most of the ravines of the basin; abundant s. of Buttermilk Glen; on the slopes of Cayuga Lake, in the proper soils; rare or absent in the McLean district and *in the hills s. of Ithaca.*

N. S. to w. Ont. and S. Dak., southw. to Fla. and Tex., including the Coastal Plain.

SUBDIVISION II. ANGIOSPERMAE

CLASS I. MONOCOTYLEDONEAE

12. TYPHACEAE (CATTAIL FAMILY)

1. Typha (Tourn.) L.

a. Staminate and pistillate parts of the spike contiguous; pollen grains in 4's; stigma fan-shaped; sterile flowers shorter than the hairs; lower leaves 12–23 mm. wide; pistillate spikes in fruit 2.5 cm. in diam. 1. *T. latifolia*

a. Staminate and pistillate parts separated by a naked interval; pollen grains single; stigma linear; sterile flowers scarcely shorter than the hairs, their cellular structure less evident.

b. Plant 1–1.5 m. high; lower leaves 3–7 mm. wide; pistillate spike in fruit 10–17 mm. in diam., 8–13 cm. long. 2. *T. angustifolia*

b. Plant 2–3.5 m. high; lower leaves 9–15 mm. wide; pistillate spike in fruit 20–23 mm. in diam., 15–25 (30) cm. long. 2a. *T. a.*, var. *elongata*

1. **T. latifolia** L. BROAD-LEAVED CATTAIL.

Alluvial marshy places, rarely invading peat bogs; common. June.

Very abundant in the large marshes near Cayuga Lake; occasional in all the townships away from the lake.

Throughout temperate N. A.; cosmopolitan.

2. **T. angustifolia** L. NARROW-LEAVED CATTAIL.

Marshy places, mostly alluvial and often brackish; frequent. June–July 10.

Swampy spot in field two miles n. of Danby; near Etna (*D.*!); Mud Creek, Freeville; w. shore of the Inlet, near its mouth (*D.*); sparingly on the Inlet Marshes; Myers Point; Union Springs; Black Brook, Tyre; abundant on the Cayuga and Canoga Marshes (*D.*!).

N. S. to Fla., mainly along the coast; also inland, principally about the Great Lakes; almost cosmopolitan.

2a. **T. angustifolia** L., var. **elongata** (Dudley) Wiegand. (See Rhodora **26**: 1. 1924. *T. latifolia*, var. *elongata* Dudley, of Cayuga Fl. *T. a.*, var. *virginica* Tidestrom.)

In the larger marshes; common. June–July.

"Occurs with the type form in large thick masses near the shore or in the water on Canoga and Cayuga Marshes and north of Hill's Branch. It is the principal form cut for chair-bottoms, and is carried away from Cayuga in considerable quantities for this purpose" (*D.*); Inlet Marshes; Union Springs; Montezuma Marshes; Black Lake.

Along the Atlantic coast and about the Great Lakes.

13. SPARGANIACEAE (BUR REED FAMILY)

1. Sparganium (Tourn.) L.

a. Fruit broadly obovoid, sessile, truncate or retuse at the summit, umbonate, 4–8 mm. in diam.; beak of the ovary in flower broad and stout at base; stigmas 2, each 2–3 mm. long, filiform; anthers 1.5–2 mm. long; sepals nearly equaling the fruit; plant tall, 8–13 dm. high; inflorescence branched. 1. *S. eurycarpum*

a. Fruit fusiform, short-pedicelled, acute or beaked; beak in flower less coarse and less deltoid; stigma 1, 0.3–2 mm. long; anthers 0.5–1 mm. long; sepals much shorter than the fruit; plant lower.

b. Fruit 5.5–14 mm. long, fusiform, with a distinct slender beak; stipe 1–4 mm. long; stigma linear, 1–2 mm. long; mature pistillate heads 12–35 mm. in diam.; staminate heads 2 or more; plant erect.

c. Pistillate heads or branches strictly axillary; fruit dull; beak abruptly contracted above the dilated base; leaves 6–12 mm. wide, without a scarious margin. 2. *S. americanum*

c. Pistillate heads usually supra-axillary; fruit lucid; beak more gradually narrowed upward; leaves 3–9 mm. wide, with a scarious margin near the base.

d. Fruiting heads (1) 2–4, remote or subremote, 1.5–2.7 cm. in diam., the lowest 1–6.5 dm. above base of plant; staminate part of inflorescence 2–10 cm. long, of 4–9 heads. 3. *S. chlorocarpum*

d. Fruiting heads 1–3, subapproximate, 1–2.2 cm. in diam., the lowest 0.1–1.8 dm. above base of plant; staminate part of inflorescence 1–4 (5) cm. long, of 2–5 heads. 3a. *S. c.*, var. *acaule*

b. Fruit 3–5.5 mm. long, more ellipsoid or obovoid; beak 1.5 mm. long or wanting; stipe 1 mm. long or less; stigma oblong or ovate, 0.3–0.6 mm. long; mature pistillate heads 5–12 mm. in diam.; staminate head solitary; plant trailing or floating. 4. *S. minimum*

1. **S. eurycarpum** Engelm. GIANT BUR REED.

In alluvial mucky soil in the larger marshes; common. June 10–July 15.

Spencer Lake; Inlet Marshes; Taughannock Point; Cayuga Marshes; and elsewhere along the shores of Cayuga Lake.

Que., N. S., and Me. to B. C., southw. to Fla., Mo., Utah, and Calif.; less frequent on the Atlantic Coastal Plain.

2. **S. americanum** Nutt. (*S. simplex* in part, probably, and var. *androcladum*, of Cayuga Fl.)

Marshy places, in mucky neutral or acid soils; common. June 15–July.

Summit Marsh; s. of Caroline Depot; near mouth of Lick Brook; Inlet Marshes; Dwyer Pond; Townley Swamp; Salmon Creek ravine; Cayuga Marshes; McLean Bogs; and elsewhere.

Newf. to Minn., southw. to Fla. and Mo.; common on the Coastal Plain.

Specimens with branched inflorescences are sometimes separated as var. *androcladum* (Engelm.) Fernald & Eames; but the branching is of little importance, since both forms, along with numerous gradations, often occur in the same colony. Fernald (Rhodora **24**: 26. 1922) has shown that Engelmann's "*androcladum*" was not this species and the name should not be applied to this form.

3. **S. chlorocarpum** Rydb. (See Rhodora **24**: 26. 1922. *S. diversifolium* of authors. *S. simplex*, in part, of Cayuga Fl.)

Marshy places, usually in calcareous soils; infrequent. June–July 15.

Summit Marsh; Inlet Marshes; Fall Creek (*D.* in C. U. Herb.); marly marsh e. end of Dryden Lake; Red Mills, and elsewhere e. of Freeville; Spring Lake. At Summit Marsh many plants were found with strictly axillary heads.

Newf. to Iowa, southw. to Conn., n. N. J., N. Y., and Ind., including the northern Coastal Plain.

3a. **S. chlorocarpum** Rydb., var. **acaule** (Beeby) Fernald.

In situations similar to the preceding; occasional. June–July 15.

Marly bog at e. end of Dryden Lake.

Newf. to N. Dak., southw. to Va. and W. Va., and on the Coastal Plain.

Plants of low stature, but with the large heads of the typical form, occur at the Cortland marl ponds. A variety of doubtful validity.

The *S. simplex* of the *Cayuga Flora* probably included *S. chlorocarpum* and its var. *acaule*, and unbranched *S. americanum*.

4. **S. minimum** Fries.

Muddy shores of ponds and ditches, mostly in neutral soils; rare. June 15–July. E. side of Summit Marsh (*K. M. W. & F. P. Metcalf*); swale s. side of Slaterville Swamp; s. side of Chicago Bog.

Newf. to Alaska, southw. to n. N. J., Pa., Tenn., Colo., and Oreg.; infrequent near the coast. Found also in Eurasia.

14. NAJADACEAE (PONDWEED FAMILY)

a. Flowers perfect, borne in spikes; anthers 2–4; leaves alternate, or the uppermost ones sometimes opposite.
  b. Stamens 4; connectives sepaloid; carpels sessile in fruit. 1. POTAMOGETON
  b. Stamens 2; connectives not enlarged; carpels stipitate in fruit. 2. RUPPIA
a. Flowers unisexual, axillary; anther 1 (2); leaves opposite or in 3's.
  b. Pistils 2–6, unsymmetrical in fruit, and undulate or toothed on one side; leaves entire, not dilated at base. 3. ZANNICHELLIA
  b. Pistil 1, fusiform, regular, not toothed; leaves serrulate, dilated at base. 4. NAJAS

1. Potamogeton (Tourn.) L.

a. Ligules distinct from the petiole or leaf base (except sometimes in no. 12); floating leaves often present. (2d *a*, p. 48.)
  b. Submerged leaves lacking or reduced to the petiole only.
    c. Blade of floating leaves ovate-oval, subcordate; fruit scarcely keeled, with a lateral depression in the nutlet. 1. *P. natans*
    c. Blade of floating leaves elliptical, tapering at base; fruit 3-keeled especially when dry, the keels undulate or crenate; lateral depression in the nutlet not present. 3. *P. americanus*, var. *novaeboracensis*
  b. Submerged leaves present, thin and delicate.
    c. Submerged leaves broader than linear.
      d. Base of submerged leaves tapering.
        e. Submerged leaves 2.5–8 cm. wide, 30–40-nerved, recurved; floating leaves 30–55-nerved; fruit large, 4–5.5 mm. long, 3-keeled. 2. *P. amplifolius*
        e. Submerged leaves 3 cm. wide or less, 3–18-nerved; floating leaves, if present, fewer-nerved than in no. 2.
          f. Submerged leaves elliptic-lanceolate or elliptical, tapering toward each end, very acute or mucronate, not suffused with red; floating leaves, when present, elliptical; 1–2 carpels of each flower developing.
            g. Floating leaves usually present; fruit more or less 3-keeled.
              h. Floating leaves small, blade 1.5–6 cm. long; submerged leaves 2–3 (6) cm. long, sessile; fruiting spikes 1–3 cm. long; fruit 2.5 mm. long, scarcely keeled; floating leaves usually obtuse, not really apiculate. 4. *P. gramineus*, var. *graminifolius*
              h. Floating leaves larger, blade 5–12 cm. long; submerged leaves 6–30 cm. long; fruiting spikes 2.5–7 cm. long; fruit 3–4 mm. long, 3-keeled at least when dry.
                i. Upper submerged leaves on petioles 8–15 cm. long, frequently wanting; floating leaves mostly obtuse, sometimes acute, not really apiculate. 3. *P. americanus*, var. *novaeboracensis*
                i. Upper submerged leaves on petioles 1–4 cm. long, usually present; floating and submerged leaves acutish and apiculate. 5. *P. angustifolius*

g. Floating leaves wanting; fruit slightly 1-keeled; stems coarse.
6. *P. lucens*

f. Submerged leaves narrowly lanceolate, evenly tapering from near the base to a bluntish tip; floating leaves spatulate, distant, all more or less suffused with red; 3–4 carpels developing; fruit 2.7–3 mm. long, 1-keeled, with a pit on the side. 7. *P. alpinus*

d. Base of submerged leaves clasping; floating leaves wanting.

e. Blade entire; fruit apiculate or blunt.

f. Leaves slightly clasping, lanceolate, rounded and cucullate at the apex, (5) 10–30 cm. long; fruit sharply 3-keeled, 4–5 mm. long; ligules 2–8 cm. long; stem whitish. 8. *P. praelongus*

f. Leaves strongly clasping, lanceolate to ovate-orbicular, 1–8 (11) cm. long, obtuse or acute; fruit obscurely 3-keeled, 2.5–4 mm. long; ligules 1–2 cm. long; stem green.

g. Ligules conspicuous, at least as shreds; peduncles spongy; spikes 1.5–3.5 cm. long; fruit 3.5–4 mm. long, green, the epicarp puckered in drying. 9. *P. Richardsonii*

g. Ligules rarely developed; peduncles slender; spikes 0.7–2 (3) cm. long; fruit 2.5–3.2 mm. long, the olive or brownish epicarp closely investing the seed; leaves usually broader, more obtuse, less nerved, and darker green in drying than in the last-named species.
10. *P. bupleuroides*

e. Blade serrulate, oblong, obtuse, crisped; fruit with a long slender beak.
11. *P. crispus*

c. Submerged leaves linear.

d. Spikes all axillary; peduncles short, 2–10 mm. long; fruit coiled, about 1 mm. long; floating leaves usually present. 12. *P. dimorphus*

d. Spikes terminal or in the upper axils only, on long peduncles; fruit not coiled.

e. Submerged leaves with cellular reticulation between the inner nerves, 2–10 mm. wide; floating leaves present; fruit 3-keeled when dry.

f. Submerged leaves 5–18 cm. long, rarely longer, 2–5 mm. wide, 5–7-nerved; floating leaves 0.7–2.4 cm. wide. 13. *P. epihydrus*

f. Submerged leaves 12–22 cm. long, 5–10 mm. wide, 9–13-nerved; floating leaves 2.5–3 cm. wide. 13a. *P. epihydrus*, var. *cayugensis*

e. Submerged leaves without cellular reticulation, or only slightly cellular near the midrib, smaller; floating leaves absent.

f. Leaves many-nerved, 2–4 mm. wide; stem wing-flattened, almost as wide as the leaves; fruit 3.5–4.5 mm. long, more or less 3-keeled.
14. *P. compressus*

f. Leaves 3–7-nerved, 0.3–3.5 mm. wide; stems not winged.

g. Principal leaves 1.8–3.5 mm. wide.

h. Nerves of the leaves 5–7; fruit 2–3 mm. long, obscurely or scarcely keeled; apex of embryo not coiled; ligules 6–17 mm. long; apex of leaf obtuse and mucronulate; spikes oblong; glands small.
15. *P. Friesii*

h. Nerves of the leaves 3 (5); fruit 3.5–4.5 mm. long, 3-keeled; apex of embryo coiled.

i. Ligules 0.5–1 cm. long; leaves acute; spikes capitate; glands at base of leaves small. 16. *P. Hillii*

i. Ligules 1.2–2 cm. long; leaves obtuse, mucronulate; spikes oblong; glands at base of leaves large. 17. *P. obtusifolius*

g. Principal leaves 0.5–1.5 mm. wide; fruit 2–3 mm. long.

h. Glands at base of leaves present; peduncles much longer than the spikes; fruit not keeled. 18. *P. pusillus*

h. Glands at base of leaves lacking; peduncles scarcely exceeding the spikes; fruit with a toothed keel. 19. *P. foliosus*

a. Ligules united with the leaf base for a considerable distance, sheathing the stem; floating leaves lacking.
b. Leaves 3 mm. wide or less, not auricled nor definitely 2-ranked; entire.
c. Stigmas scarcely visible on the fruit, broad and sessile; leaves retuse, blunt, or often shortly apiculate.
d. Whorls of flowers 5–12, evenly spaced or the lower ones somewhat remote; primary sheaths swollen, two to five times thicker than the stem; primary leaves short and ribbon-like, upper leaves filiform; plants long and coarse. 20. *P. vaginatus*
d. Whorls of flowers 2–5, the upper ones approximate, the lower ones remote; sheaths tight, leaves all filiform; plants short and fine. 21. *P. filiformis*, var. *borealis*
c. Stigma raised on a minute style, capitate, narrow; leaves gradually acuminate. 22. *P. pectinatus*
b. Leaves 4–8 mm. wide, auricled at the base, stiffly 2-ranked, with a cartilaginous, finely and sharply serrate, margin. 23. *P. Robbinsii*

1. **P. natans** L.

Shallow ponds and stagnant water; frequent. Fr. July–Sept.

Spencer Lake; Red Mill Pond; Renwick; s. w. corner of Cayuga Lake; Duck Lake; and elsewhere.

Newf. to B. C., southw. to n. N. J., Pa., Mo., Nebr., and Calif.; almost cosmopolitan in the temperate countries.

2. **P. amplifolius** Tuckerm.

Ponds, slow streams, and lake waters; frequent. Fr. Aug.

Spencer Lake; Cayuta Lake (*D.*); mouth of Fall Creek (*D.*!); Freeville; Lake Como (Locke Pond, *D.*); Dryden Lake (*D.*); Cayuga; Black Brook, Tyre.

N. S. to B. C., southw. to n. N. J., Ky., Kans., and Calif.; rare or absent on the Atlantic Coastal Plain.

3. **P. americanus** C. & S., var. **novaeboracensis** (Morong) Benn. (*P. fluitans* of Gray's Man., ed. 6. *P. lonchites* of Cayuga Fl. *P. natans*, var *prolixus*, of Cayuga Fl.?)

Slow streams and quiet lake waters; frequent. Fr. Aug.–Sept.

Spencer Lake; Dryden Lake (*D.*); mouth of Fall Creek (*D.*!); Renwick, on the lake front; outlet to North Spring, Union Springs; Canoga Marshes; Cayuga (*D.*); Erie and Seneca Canals (*D.*!).

N. B. to B. C., southw. to Fla., Tex., Mex., and Calif., including the Atlantic Coastal Plain. Found also in W. I.

The submerged leaves are usually absent at fruiting time, and the plant is then sometimes mistaken for *P. natans*.

4. **P. gramineus** L., var. **graminifolius** Fries. (See Rhodora **23**: 189. 1921. *P. heterophyllus* and forma *graminifolius* of Gray's Man., ed. 7. *P. gramineus* of Cayuga Fl.)

Ponds, slow streams, and lake borders; frequent. Fr. Aug.

Spencer Lake; Summit Marsh (*D.*!); Cayuta Lake (*D.*); near the Ithaca lighthouse (*D.*); Myers Point (*D.*!); Ledyard; Union Springs; Cayuga Marshes. At Spencer Lake, where the water is shallow and the bottom is sandy or marly, the plant approaches *P. heterophyllus*, forma *myriophyllus* (Robbins) Morong.

Widely spread throughout the greater part of N. A.; common along the coast; very variable.

5. **P. angustifolius** Berch. & Presl. (*P. Zizii* of Cayuga Fl.)

Slow streams and the smaller lakes; scarce. Fr. Aug.-Sept.

Spencer Lake; Summit Marsh (*D.*!); bayou near mouth of Fall Creek (*D.*); Union Springs; Phillips Pond; pond n. w. of Lowery Ponds (*D.* in C. U. Herb.); Duck Lake.

Que. and Mass. to Calif., southw. to Fla., Tex., and Wyo.; rare or absent on the Atlantic Coastal Plain. Found also in W. I., Eurasia, and Africa.

6. **P. lucens** L.

Shallow water; infrequent. Fr. Aug.-Sept.

"West side of Cayuga L. and near Cayuga Bridge and Seneca River" (*D.*!); s. end of Cayuga Lake (*D.* in C. U. Herb.).

N. S. to Calif., southw. to Fla. and Mex.; rare or absent on the Atlantic Coastal Plain. Found also in W. I., Eurasia, and Africa.

This species is difficult to distinguish from *P. angustifolius*. In both species the leaves are apiculate. Fruiting specimens of *P. lucens* may be recognized by the absence of floating leaves and by the 1-keeled fruits. The vegetative parts of this species are coarser and more pellucid than in *P. angustifolius*.

7. **P. alpinus** Balbis. (*P. rufescens* of Cayuga Fl.)

Doubtfully reported by Dudley from Summit Marsh, Myers Point, and pool two miles north, but not seen in recent years. Occurs near by in Cortland Co.

Lab. to Alaska, southw. to Mass., n. N. J., Mich., Minn., Utah, and Calif.; rare on the Atlantic Coastal Plain. Found also in Greenland and Eurasia.

8. **P. praelongus** Wulf.

Shallow or rather deep lake waters; infrequent. Fr. Aug.-Sept.

S. w. part of Cayuga Lake (*D.*); occasional at foot of Cayuga Lake (*D.*).

Newf. to B. C., southw. to Conn., N. J., Great Lakes, Iowa, Mont., and Calif.; rare or absent on the Atlantic Coastal Plain.

9. **P. Richardsonii** (Benn.) Rydb. (*P. perfoliatus* and var. *lanceolatus* of Cayuga Fl.)

Shallow and deep waters of lakes and pools; frequent. Fr. July-Sept.

Ithaca fair grounds; Renwick; Myers Point; Union Springs; Canoga and Cayuga Marshes; Cayuga; Cayuga outlet (*D.*).

Que. to Mackenzie and B. C., southw. to N. E., N. Y., Great Lakes, and Nebr. (?); probably absent on the Atlantic Coastal Plain.

P. perfoliatus L., included in Dudley's catalog, is far northern in distribution.

10. **P. bupleuroides** Fernald.

In shallow lake waters, usually on sandy bottoms; scarce. Fr. July-Sept.

Renwick (*R. Hitchcock*); Myers Point (*D.* in C. U. Herb.); n. of Canoga Marshes; n. of railway bridge, Cayuga (*C. C. Thomas*); Duck Lake (*A. J. E., K. M. W., & L. F. Randolph*).

Newf. and e. Que. to Fla., rarely inland to w. N. Y. and Mich.; mostly in brackish situations.

11. **P.** CRISPUS L.

Waters of large lakes and their adjacent marshes; frequent or common. Fr. June-July, but rarely fruiting.

Not found back from the Cayuga Lake Valley and its outlet system; perhaps confined to the lake because of salt requirements. *This is the earliest species to fruit.*

Mass. to Ont. and Va., in fresh or brackish marshes. Naturalized from Eu.

12. **P. dimorphus** Raf. (*P. Spirillus* of Cayuga Fl.)

Shallow water, in sand; rare. Fr. Aug.

Cayuta Lake, e. side (*D.*).

Newf. to Minn. and Calif., southw. to Va., W. Va., and Nebr., including the Atlantic Coastal Plain.

13. **P. epihydrus** Raf. (*P. Claytonii* of Cayuga Fl. *P. pennsylvanicus* Willd. *P. Nuttallii* C. & S.)

Still shallow pools and lake margins; frequent. Fr. Aug.–Sept.

Spencer Lake; Cayuta Lake (*D.*); Caroline; Stewart Park; and elsewhere.

Newf. to B. C., southw. to S. C. and Iowa, including the Atlantic Coastal Plain.

13a. **P. epihydrus** Raf., var. **cayugensis** (Wiegand) Benn.

In situations similar to the preceding; less frequent. Fr. Aug.–Sept.

Spencer Lake; Summit Marsh; Renwick; and elsewhere.

Lab. to Wash., southw. to N. Y., Mich., and Iowa. Found also in Japan.

14. **P. compressus** L. (*P. zosterifolius* Schum. and of Cayuga Fl.)

Small or large lakes, and mill ponds; frequent. Fr. July–Sept.

Summit Marsh (*D.*); Dryden Lake (*D.*); Lake Como (Locke Pond, *D.*); Red Mill Pond (*D.*); Malloryville (*D.*); Beebe Lake; Renwick; Cayuga Marshes.

N. B. to B. C., southw. to Md., the Great Lakes, Iowa, and Oreg.; rare or absent on the Atlantic Coastal Plain. Found also in Eurasia.

15. **P. Friesii** Rupr. (*P. pusillus*, var. *major*, of Cayuga Fl.)

Shallow water; scarce. Fr. Aug.–Sept.

Summit Marsh (*D.* in C. U. Herb.); Spencer Lake (*L. Griscom & E. Moore*); s. w. part of Cayuga Lake (*D.* in C. U. Herb.); near mouth of Fall Creek (*D.*); Cayuga Bridge (*D.*).

S. Lab. to B. C., southw. to N. S., Conn., N. Y., Mich., Iowa, and Wash.; doubtfully occurring on the Atlantic Coastal Plain. Found also in Eu.

16. **P. Hillii** Morong.

Pools, ditches, and shallow lake margins; "not uncommon" (*D.*). Fr. July–Aug.

Dryden Lake (*D.*); Red Mill Pond (*D.*); pools n. and s. of Ithaca (*D.*); Inlet (*D.*); Myers Point (*D.*). Not found in recent years, perhaps overlooked.

Conn. to cent. Ont. and Wis., southw. to Pa. and Mo.; chiefly inland.

17. **P. obtusifolius** Mert. & Koch.

Shallow water of ponds and streams; rare. Fr. Aug.

"Summit Marsh, in the shallow water not far from the northernmost island, where it occurs but sparingly" (*D.*); Spencer Lake (*E. Moore*).

E. Que. to Athabasca, southw. to Pa., Mich., Wis., and Wyo.; of doubtful occurrence on the Coastal Plain. Found also in Eurasia.

18. **P. pusillus** L.

Ditches, pools, and lake borders; frequent. Fr. July–Sept.

Danby; Spencer Lake; Freeville; Mud Pond, McLean Bogs; near mouth of Fall Creek (*D.*!); Cayuga; pool, Cato.

Que. to B. C., southw. to N. E., cent. and w. N. Y., N. Mex., Ariz., and Calif.; apparently infrequent on the Atlantic Coastal Plain. Found also in Eurasia.

True *P. pusillus* is a plant chiefly of brackish or limy waters. The var. *tenuissimus*, inhabiting fresh and acid waters, has been found in Cortland and Oswego Counties, but not within the Cayuga Lake Basin. It differs in its narrower leaves (0.4–1.4 mm. instead of 1–2 mm.), more obscure lateral nerves, shorter peduncles (0.5–2 cm. instead of 1.5–8 cm.), and shorter mature spikes (3–5 mm. instead of 5–12 mm.).

19. **P. foliosus** Raf. (*P. pauciflorus* of Cayuga Fl.)

Ditches, pools, and slow-flowing streams; frequent. Fr. July–Sept.

Pool in Enfield Creek n. w. of Key Hill; Jennings Pond, near Negundo Woods, "a larger leaved form" (*D.*); near mouth of Fall Creek (*D.!*), Dwyer Pond; *Union Springs*; Cayuga; Lowery Ponds.

N. B. to B. C., southw. to Fla., N. Mex., and Calif., less frequent on the Atlantic Coastal Plain. *Probably also in W. I. and Mex.*

20. **P. vaginatus** Turcz. (See Rhodora **18**:131. 1916, and **20**:191. 1918. *P. moniliformis* St. John. *P. pectinatus*, var., no. 1008 of Cayuga Fl.)

Deep water; *rare.*

Cayuga Lake, near the Ithaca lighthouse (*D.!*). Nearly always sterile.

Lab. to Sask. and Alberta, southw. to Cape Breton, s. N. B., N. Y., Wis., and N. Dak. Found also in Eurasia.

21. **P. filiformis** Pers., var. **borealis** (Raf.) St. John. (See Rhodora **18**:134. 1916. *P. marinus* of Cayuga Fl.)

Shallow lake waters, usually with sandy and marly bottoms, perhaps influenced *by brackish conditions; scarce.* Fr. June–July.

Renwick, under the pier; Myers Point; Sheldrake; s. of Big Gully Point; near *Howland Point*; "near Union Springs" (*D.!*); Canoga Marshes.

Newf. to Alaska, southw. to n. Me., N. Y., Pa., and Colo. Found also in India, Tibet, and China. "Chiefly in calcareous waters" (*St. John*).

22. **P. pectinatus** L.

Slow streams, pools, and borders of lakes, in more or less brackish or strongly calcareous waters; *locally* common. *Fr.* Aug.–Sept.

Rare in the Cayuga Lake Basin except in the waters and marshes of the lake and in the Montezuma Marshes, where it is common; found also in Newton Ponds and in Mud Pond, McLean Bogs. A large, coarse form occurs near the lighthouses at Ithaca, with larger leaves and much elongated peduncles (25 cm. long) but with the contracted sheaths of *P. pectinatus.* This was discussed by Dudley under his var., no. 1007.

E. Newf. to B. C., southw. to Fla., Tex., and Calif.; infrequent on the Atlantic Coastal Plain. Found also in Eu.

23. **P. Robbinsii** Oakes.

Lakes and very slow streams; infrequent.

"Abundant in all our lakes, but not yet found in flower or fruit" (*D.*); Cayuga; near Ithaca (*D.* in C. U. Herb.). The infrequency of recent collections would *scarcely indicate that it is abundant, as* Dudley *states.*

N. B. to n. Ont., southw. to Del., Pa., and n. Ind.; also Wyo. and s. B. C., to Nev. and Wash.; rare or absent on the Atlantic Coastal Plain.

2. Ruppia L.

1. **R. maritima** L., var. **longipes** Hags. (See Rhodora **16**: 125. 1914.)

Salt or brackish waters; rare. Fr. July.

Salt Pond w. of Howland Island, *1916* (*K. M. W. & F. P. Metcalf*).

Newf. to Fla., Tex., and Calif., along the coast, and inland in cent. N. Y. Found also in W. I. and Asia.

3. Zannichellia (*Michx.*) L.

1. **Z. palustris** L., var. **major** (Boen.) Koch. (See Rhodora **23**:110. 1921. *Z. palustris* and var. *pedunculata* of Cayuga Fl.)

Pools and ditches; most common in the vicinity of salt springs, and perhaps always dependent on traces of salt; frequent. Fr. July–Aug.

Ditches on the Inlet Marshes (*H. B. Lord, D.!*) Beebe Lake; Renwick; Myers Point; King Ferry (*D.*); Sheldrake (*D.*); Canoga (*D.*); Union Springs; Cayuga (*D.*); near Indian Salt Springs (*D.*); Montezuma; Lowery Ponds.

Throughout N. A., chiefly in brackish water; nearly cosmopolitan.

4. **Najas** L.

a. Leaves coarsely and distantly toothed, the auricles large; seeds very finely lineate, oblong in outline.
- *b.* Auricles without conspicuous teeth; blades ascending or spreading, as also the stems.
  - *c.* Leaves 2 mm. wide; auricles entire. — 1. *N. marina*
  - *c.* Leaves 0.5 mm. wide; auricles denticulate. — 1a. *N. m.*, var. *gracilis*
- *b.* Auricles with a single strong projecting tooth on each side; blades recurved, coarsely toothed, purplish; stem also recurved. — 1b. *N. m.*, var. *recurvata*

a. Leaves minutely serrulate, the auricles scarcely dilated; seeds smooth, oval-lanceolate in outline. — 2. *N. flexilis*

1. **N. marina** L.

Shallow lake waters, probably influenced by the salt springs of the neighborhood; local. Fr. July–Sept.

Frequent near Canoga Marshes (*D.!*), and north of the railroad bridge, Cayuga (*D.!*); Duck Lake (*A. J. E., K. M. W., & L. F. Randolph*); Crusoe Lake (*J. G. Needham & C. W. Leister*).

In the vicinity of salt springs: N. Y., Mich., Minn., and Fla., and from Utah to Calif. and Mex. Found also in W. I., Eurasia, and Australia.

1a. **N. marina** L., var. **gracilis** Morong.

"Off Canoga Marshes" (*D.*).

Cent. N. Y. and Fla.

The validity of this and the following variety may be questioned. They should receive further study.

1b. **N. marina** L., var. **recurvata** Dudley.

"In the shallow water of Black L. Cayuga Marshes" (*D.*); "Cayuga Lake" (*Morong* in Gray Herb.).

N. Y., Utah, and Ariz.

2. **N. flexilis** (Willd.) Rostk. & Schmidt.

Pools and lakes; common. Fr. July–Aug.

Lab. to B. C., southw. to Fla., Tex., and Calif. Found also in Eurasia.

15. JUNCAGINACEAE (ARROW GRASS FAMILY)

a. Carpels nearly distinct, broad, divaricate, follicular; anthers linear; raceme few-flowered; rootstocks strongly creeping. — 1. SCHEUCHZERIA

a. Carpels united until maturity, then separating from the persistent axis, the fruit subcylindrical; anthers oval; raceme many-flowered; rootstocks but slightly developed. — 2. TRIGLOCHIN

1. **Scheuchzeria** L.

1. **S. palustris** L., var. **americana** Fernald. (See Rhodora 25: 177. 1923.)

Sphagnum bogs, in acid soils; rare. May 25–June.

Junius peat bogs (*D.!*); n. end of Duck Lake (*K. M. W., L. H. MacDaniels, & F. P. Metcalf*); Featherbed Bog (*F. P. Metcalf*).

Newf. to Hudson Bay and Alaska, southw. to N. J., Pa., Wis., and Calif.; rare on the Atlantic Coastal Plain. Found also in Eurasia.

2. Triglochin L.

a. Fruit oblong or ovoid, rounded at the base; carpels usually 6, rarely 3. 1. *T. maritima*
a. Fruit linear or clavate, tapering to a subulate base: carpels 3. 2. *T. palustris*

1. T. maritima L.

Brackish marshes or bogs; rare. June–July.
Miller Bog, Spring Lake (*F. P. Metcalf, L. Griscom, & A. H. Wright*); Westbury Bog (*K. M. W. & F. P. Metcalf*).
In salt marshes along the coast from Lab. to N. J., and in saline places across the continent to Alaska and Mexico. Found also in Eurasia and n. Africa.

2. T. palustris L.

Marshy or springy places, mostly in marl, also possibly in brackish soils; rare. June–Aug.
Junius marl ponds (*D.*!); e. edge of Crusoe Prairie (*A. J. E. & F. P. Metcalf*).
Greenland to s. Me. along the coast, and inland along the St. John and St. Lawrence Rivers, to the Great Lakes; thence westw. to Colo. and Alaska. Found also in Eurasia.

16. ALISMACEAE (WATER PLANTAIN FAMILY)

a. Flowers perfect; stamens 6–9; carpels in a ring. 1. ALISMA
a. Flowers monoecious; stamens many; carpels in a head. 2. SAGITTARIA

1. Alisma L.

a. Corolla 7–13 mm. wide; fruiting head 4–7 mm. in diam.; achenes 2.2–3 mm. long. 1. *A. Plantago-aquatica*
a. Corolla 3–5.5 mm. wide; fruiting head 3–4 mm. in diam.; achenes 1.5–2 mm. long. 1a. *A. P.*, var. *parviflorum*

1. **A. Plantago-aquatica** L. (*A. Plantago*, var. *americanum*, of Cayuga Fl. *A. subcordatum* of Britton & Brown's Ill. Flora.) WATER PLANTAIN.

Muddy ditches and swamps, mostly in clayey and alluvial soils with no apparent relation to lime content; frequent. July 20–Aug.
Ithaca flats; Forest Home; and probably elsewhere.
Que. and N. S. to B. C., southw. to N. Y., (Del.?), N. Dak., and Calif., including the Atlantic Coastal Plain.
A recent study of a large quantity of material does not seem to support Britton's contention that the American and the European plants are specifically distinct.

1a. ***A. Plantago-aquatica*** *L., var.* ***parviflorum*** *(Pursh) Farwell. (Rept. Comm. Parks and Boulev., Detroit, 11: 44. 1900.)*

In situations similar to the preceding; frequent.
Summit Marsh; Ithaca flats; Taughannock Gorge; n. e. of Asbury; and probably elsewhere.
N. S. to Minn., southw. to Fla. and Tex., including the coast.

2. Sagittaria L.

a. Leaves sagittate or hastate (very rarely with 1–2 elliptical leaves in *S. latifolia*, forma *diversifolia*); fertile heads pedicelled.
  b. Style papilliform; beak a tiny erect point from a notch at one corner of the rounded summit of the achene; leaves sagittate; blades broad, abruptly acute, rarely more than 10 cm. long. 1. *S. cuneata*
  b. Style subulate or longer; beak triangular or usually subulate, from one-half the diam. to longer than the diam. of the achene, incurved usually at right angles.
    c. Blade acute; middle lobe 1.4 or more times as long as broad. 2. *S. latifolia*

c. Blade obtuse, very large; middle lobe 1–1.3 times as long as broad. 2a. *S. l.*, var. *obtusa*

a. Leaves not sagittate, or occasionally with very short and narrow basal lobes; fertile heads nearly or quite sessile, with long styles. (*S. graminea*, which should occur in sandy ponds in this flora, has slender-pedicelled heads and minute styles). 3. *S. heterophylla*

1. **S. cuneata** Sheldon. (See Britton & Brown, Ill. Fl. *S. arifolia* Nutt.) ARROW-LEAF. ARROW-HEAD.

Alluvial mucky marshes; scarce. July–Aug.

Spencer Lake; Jennings Pond; Inlet Marshes, near L. V. R. R. roundhouses; mouth of Fall Creek; Farley Point; outlet of North Spring, Union Springs; Black Lake; Crusoe Prairie.

Que. to Mich., N. Dak., and B. C.; southw. to cent. Me., Conn., N. Y., Kans., N. Mex., and Calif.; rare or absent on the Atlantic Coastal Plain.

In deep water, ribbon-like phyllodia are frequently produced.

2. **S. latifolia** Willd. (*S. variabilis* of Cayuga Fl.) ARROW-LEAF. ARROW-HEAD.

Ditches, shores, and marshes, in mucky or gravelly, often alluvial, soil, apparently with little reference to lime content; common. July–Aug.

N. S. to B. C., southw. to Fla., Mex., and Calif., including the Atlantic Coastal Plain.

The leaf outline of this plant varies greatly with the depth of the water and exposure to wave action, the form with narrower leaves being found in deep water. Forms intergrading between those with broad leaves and those with narrow leaves are often found in the same colony. The extremely narrow-leaved form, with linear lobes 7 mm. broad or less, is forma *gracilis* (Pursh) Robinson. Occasionally this form seems to be independent of the depth of the water. In deep water, phyllodia are occasionally developed in this species. The forma *diversifolia* (Engelm.) Robinson is an occasional variant from both typical *S. latifolia* and forma *gracilis*.

2a. **S. latifolia** Willd., var. **obtusa** (Muhl.) Wiegand. (Rhodora **27**: 186. 1925.)

Ditches and swales about the larger lake marshes, occasionally elsewhere; common. Aug.

Spencer Lake; Inlet Marshes (*D.*!); Fall Creek, swale below Varna; e. of Etna; Cayuga Marshes (*D.*!); Black Lake; Crusoe Lake.

This is the largest and most distinct form, though occasionally it is almost equaled in size by typical *S. latifolia*. Its leaf outline is like that of var. *pubescens* (Muhl.) J. G. Sm. Brackish conditions may influence its distribution.

3. **S. heterophylla** Pursh.

Shores of the larger lakes, and in the larger marshes adjoining, rarely elsewhere, preferring rich gravelly or silty, often calcareous, soils; locally abundant. July–Sept.

Spencer Lake; Summit Marsh (*D.*!); frequent near Cayuga Lake (*D.*!); Inlet Marshes; Union Springs; Cayuga Marshes (*D.*!).

Que. to Minn., southw. to Fla. and Nebr. A plant primarily of the interior.

The vars. *elliptica*, *rigida*, and *angustifolia* are environmental forms due to depth of water and wave action, and are scarcely worthy of nomenclatorial recognition.

17. HYDROCHARITACEAE (FROG'S BIT FAMILY)

a. Leaves small, whorled, cauline; spathes sessile or nearly so; tube of perianth of pistillate flowers elongating immensely with depth of water. 1. ELODEA

a. Leaves elongated, ribbon-like, basal; spathes peduncled, the stalk of the pistillate inflorescence very long, coiled, and reaching the surface; perianth without a tube. 2. VALLISNERIA

1. **Elodea** Michx.

a. Leaves 1.2–4 mm. wide (averaging 2.13 mm.); spathe of the staminate flower oblong-linear, 11–13 mm. long, constricted at base into a stipe-like part, the orifice gaping, 2-lobed; staminate flower remaining attached by means of a long filiform peduncle; sepals or mature bud of the staminate flowers 3.8–5 mm. long; anthers 2.2–2.5 mm. long; sepals or mature bud of the pistillate flowers 2.3–2.7 mm. long. 1. *E. canadensis*

a. Leaves 0.7–1.8 mm. wide (averaging 1.3 mm.); spathe of the staminate flower globose, apiculate, the body about 2 mm. long; staminate flower sessile, breaking out of the spathe and rising free to the surface before anthesis; sepals or mature bud of the staminate flowers 2–2.5 mm. long; anthers 0.8–1.1 mm. long; sepals or mature bud of the pistillate flowers 1.2–1.8 mm. long. 2. *E. occidentalis*

1. **E. canadensis** Michx. (Including *E. Planchonii* Caspary and *E. ioensis* Wylie.) WATER-WEED.

Pools and slow-flowing streams, in more or less calcareous waters; common, especially near Cayuga Lake and on the Ontario plain. July–Aug.

Que. and N. E. to Sask. and Wyo., southw. to N. Y., Ky., and Ill.; rare on the Coastal Plain.

Recent authors (see St. John, Rhodora **22**: 17. 1920) have treated *E. canadensis* and *E. Planchonii* as distinct species. After an extended study of the local material and that in one of the larger herbaria, the view is taken that they represent the two sexes of the same species.

2. **E. occidentalis** (Pursh) St. John. WATER-WEED.

In locations similar to the preceding; more local. July–Aug.

Reported only from near the mouth of Fall Creek, but probably occurring elsewhere about Cayuga Lake.

S. Me. to Wis. and Oreg., southw. to D. C., Mo., and Nebr. More frequent than the last-named species in the more sandy noncalcareous and brackish regions.

2. **Vallisneria** (Michx.) L.

1. **V. americana** Michx. (See Rhodora **20**: 108. 1918. *V. spiralis* of Cayuga Fl.) EEL GRASS.

Lakes and larger slow-flowing streams; locally common. Aug.

Cent. Me. to S. Dak., southw. to Fla. and Tex.; occasional on the Coastal Plain.

18. **GRAMINEAE** (GRASS FAMILY)[4]

a. Spikelets 1–many-flowered, terete or laterally compressed, when 2-flowered the lower floret not sterile and not of a different texture from the upper floret; internodes usually present between the flowers; rhachilla generally articulated above the empty glumes (several exceptions).

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[4] The terms ***empty glumes, flowering glumes,*** and ***palets*** have been retained here, because *they are of particular pedagogical value in indicating homology in the grass spikelet.* According to this terminology, all leaf organs on the primary axis are glumes, and those on the secondary axis are palets. The two regularly empty glumes are termed ***empty glumes***; if others above are staminate or neutral, they are termed ***sterile flowering glumes***, a designation which expresses their real nature. ***Palet*** is a more distinctive term than ***palea***, as the latter term is used in other families and often without morphological significance.

The tribes are here presented in an order almost inverse to the usual sequence, because this seems to represent more nearly the probable course of evolution. The earlier tribes are less specialized, the later ones more so. The Festuceae are probably the most primitive, with the Hordeae branching off in one direction, and the other tribes forming a series which branches off in another direction. The arrangement is essentially the same as that in Hitchcock's ***Genera of Grasses of the United States*** (United States Department of Agriculture, Bul. 772).

Measurements giving the length of empty or of flowering glumes are exclusive of the awns.

b. Spikelets borne in a 2-rowed spike.
c. Spikelets on opposite sides of the rhachis; spike solitary, terminal. 2. Tribe HORDEAE
c. Spikelets on one side of the rhachis, the spikes therefore one-sided; spikes solitary or several. 5. Tribe CHLORIDEAE
b. Spikelets in panicles, either open or spike-like, rarely in racemes.
c. Spikelets 2–many-flowered.
d. Tip of the lowest flowering glume usually extending beyond the tips of the small empty glumes, awnless or awned at the tip, more rarely just below the tip or between the teeth. 1. Tribe FESTUCEAE
d. Tip of the lowest flowering glume usually reaching the tips of the large, often broad, empty glumes, or shorter, usually with a bent awn inserted on the back or between the teeth, more rarely awnless. 3. Tribe AVENEAE
c. Spikelets with one fertile flower.
d. Spikelets bisexual, all alike.
e. Sterile flowering glumes none (i. e., the flower solitary and fertile); palet 2-nerved.
f. Palet usually smaller than the flowering glume and inclosed in it, usually 2-keeled; articulation of rhachilla either above or below the empty glumes. 4. Tribe AGROSTIDEAE
f. Palet about equaling the flowering glume, 1-keeled; articulation of rhachilla below the empty glumes; (empty glumes minute). 7. Tribe ORYZEAE
e. Sterile flowering glumes 2 (i. e., spikelets 3-flowered but the two lower flowers sterile); palet 1(2)-nerved. 6. Tribe PHALARIDEAE
d. Spikelets unisexual; pistillate at summit of panicle, erect, linear-subulate, awned; staminate at base of panicle, drooping, elliptical, unawned; rhachilla articulated below the glumes. 8. Tribe ZIZANIEAE
a. Spikelets 2-flowered, the upper floret perfect, the lower one staminate or neutral and often of a different texture; internodes between the florets usually undeveloped; rhachilla articulated below the empty glumes.
b. First empty glume smaller than the second; the upper fertile flowering glume cartilaginous or chartaceous, firmer than the empty glumes; spikelets all alike and not in special clusters as in the next tribe, without long silky hairs. 9. Tribe PANICEAE
b. First empty glume larger than the second; the flowering glumes hyaline and much more delicate than the empty glumes; spikelets in tiny clusters of 2 or 3, 1 fertile and 1 or 2 sterile or all fertile, with long silky hairs at base of flowering glume or on rhachis or pedicels. 10. Tribe ANDROPOGONEAE

Tribe 1. *Festuceae*

a. Spikelets bisexual; panicle generally open.
b. Rhachilla naked or short-pilose; plant not reed-like.
c. Flowering glumes 5–many-nerved, sometimes cobwebby at base.
d. Spikelets not in dense 1-sided bunches on the rays of the panicle.
e. Flowering glumes rounded on the back, with no cobwebby hairs.
f. Nerves of the flowering glumes not prominent.
g. These nerves converging at apex of the acute flowering glume.
h. Spikelets more than 12 mm. long, rarely shorter; flowering glumes bifid at the apex, or more than 5-nerved, usually awned just below the apex between or behind the teeth.
i. Grain pubescent at summit, adhering to the palet; stigmas inserted below a hairy cushion-like appendage at summit of ovary. 1. BROMUS
i. Grain not pubescent, free; stigmas terminal. 2. BROMELICA

h. Spikelets 5–12 mm. long, sometimes longer in a few species; flowering glumes entire, often awned at apex, with no more than 5 nerves; grain glabrous, often free from the palet. 3. FESTUCA

g. These nerves not converging at apex; flowering glumes obtuse. 5. PUCCINELLIA

f. Nerves of the flowering glumes prominent, raised, not converging at the apex. 4. GLYCERIA

e. Flowering glumes keeled, often with cobwebby hairs at the base. 6. POA

d. Spikelets in dense 1-sided clusters on the rays of the panicle. 10. DACTYLIS

c. Flowering glumes 3-nerved (see also Poa with one pair of nerves obscure), muticous, not cobwebby at base; spikelets in open panicles (see also 3d *c*). 7. ERAGROSTIS

c. Flowering glumes 1–3-nerved, short-awned, not cobwebby at base; spikelets in elongated, racemosely disposed, spikes. 8. DIPLACHNE

b. Rhachilla covered with long silky hairs which at maturity exceed the glumes; plant tall, reed-like, 1.5–4 m. high. 9. PHRAGMITES

a. Spikelets unisexual, clustered, the terminal member of each cluster pistillate and with broad glumes, the lateral members staminate and with many very narrow glumes; inflorescence a spike-like panicle. 11. CYNOSURUS

Tribe 2. *Hordeae*

a. Spikelets solitary at each joint of the rhachis, 2–many-flowered.
b. Spikelets placed flatwise to the rhachis; both empty glumes developed. 12. AGROPYRON
b. Spikelets placed edgewise to the rhachis; empty glume adjacent to the rhachis wanting. 13. LOLIUM
a. Spikelets 2 or 3 at each joint of the rhachis, placed edgewise.
b. Spikelets at each joint similar, all 2–6-flowered and fertile.
c. Empty glumes well developed; spikes rather dense. 14. ELYMUS
c. Empty glumes minute or wanting; spikes very open, with divaricate spikelets. 15. ASPERELLA
b. Spikelets at each joint dissimilar, the central spikelet 1-flowered and fertile, the lateral one sterile and rudimentary. 16. HORDEUM

Tribe 3. *Aveneae*

a. Empty glumes very unequal, one enlarged and often obtuse; spikelets 3–4 mm. long. 17. SPHENOPHOLIS
a. Empty glumes nearly equal.
b. Awn dorsal or wanting.
c. Awns not hooked; plant not velvety.
d. Spikelets 22–25 mm. long. [AVENA]
d. Spikelets 7–8 mm. long. 18. ARRHENATHERUM
d. Spikelets 4–5 mm. long. 19. DESCHAMPSIA
c. Awns hooked at tip, at least when dry; plant velvety. 20. GINANNIA
b. Awn from between the two apical teeth. 21. DANTHONIA

Tribe 4. *Agrostideae*

a. Flowering glumes as thin as or thinner than the empty glumes; spikelets laterally compressed or subterete.
b. Rootstocks not densely scaly; flowering glumes dorsally awned or awnless.
c. Empty glumes slightly compressed, not wing-carinate; panicles open or contracted, but not very dense.

d. Floret sessile; spikelet disarticulating between empty and flowering glumes; palet 2-nerved; stamens 3.
e. Callus long-hairy; rhachilla prolonged behind the palet. 22. CALAMAGROSTIS
e. Callus glabrous; rhachilla not prolonged.
f. Flowering glume shorter than the empty glumes and thinner, obtuse, 3-nerved. 23. AGROSTIS
f. Flowering glume equaling or exceeding the empty glumes and of the same texture, acute, 1-nerved. 25. SPOROBOLUS
d. Floret stipitate; spikelet disarticulating below the empty glumes; palet 1(2)-nerved; stamen 1. 24. CINNA
c. Empty glumes very much compressed, almost wing-carinate; spikelets in very dense spike-like panicles.
d. Empty glumes not aristate; flowering glume awned below the middle. 26. ALOPECURUS
d. Empty glumes aristate; flowering glume awnless. 27. PHLEUM
b. Rootstocks short, often branched, very scaly and knotty; flowering glume awned at the tip, or awnless.
c. Rhachilla not prolonged behind the palet; callus and rhachilla hairs more or less developed; culms usually branching above; leaves not broad. 28. MUHLENBERGIA
c. Rhachilla prolonged; callus and rhachilla hairs wanting; culms not branching above; leaves very broad, lanceolate. 29. DILEPYRUM
a. Flowering glumes thicker and firmer than the empty glumes; spikelets dorsally compressed or terete.
b. Spikelets awnless, dorsally compressed; flowering glume without a callus, the margins inrolled. 30. MILIUM
b. Spikelets awned, subterete; flowering glume with a callus, the margins not inrolled. 31. ORYZOPSIS

Tribe 5. *Chlorideae*

a. Spikelets 3–6-flowered. 32. ELEUSINE
a. Spikelets 1-flowered.
b. Empty glumes broad, equal; spikelets orbicular. [BECKMANNIA]
b. Empty glumes narrow, unequal; spikelets ovate-lanceolate. 33. SPARTINA

Tribe 6. *Phalarideae*

a. Sterile flowering glumes not reduced.
b. These glumes staminate and awnless; empty glumes subequal. 34. HIEROCHLOË
b. These glumes empty and dorsally awned; empty glumes very unequal. 35. ANTHOXANTHUM
a. Sterile flowering glumes much reduced, awnless; empty glumes equal. 36. PHALARIS

Tribe 7. *Oryzeae*

One genus. 37. LEERSIA

Tribe 8. *Zizanieae*

One genus. 38. ZIZANIA

Tribe 9. *Paniceae*

a. Spikelets without an involucre.
b. Second flowering glume chartaceous, with hyaline flat margins; inflorescence of digitate spike-like branches. 39. DIGITARIA
b. Second flowering glume thicker, with firm inrolled margins.
c. Branches of the inflorescence more or less 1-sided and spike-like.

d. Inflorescence of 1–several distant spikes; spikelets suborbicular, blunt, smooth. 40. PASPALUM
d. Inflorescence of several branches forming a panicle; spikelets obtuse, acute, or awned, hispid or hispidulous, large. 41. ECHINOCHLOA
c. Branches of the inflorescence not 1-sided and scarcely ever spike-like; spikelets various, in an open panicle. 42. PANICUM
a. Spikelets surrounded by an involucre; inflorescence spike-like.
b. Involucre of bristles. 43. SETARIA
b. Involucre spherical, prickly, with the spikelets inside. 44. CENCHRUS

Tribe 10. *Andropogoneae*

a. Inflorescence of spike-like parts. 45. ANDROPOGON
a. Inflorescence an open panicle. 46. SORGHASTRUM

Tribe 1. *Festuceae*

1. Bromus L.

a. Spikelets 1–2 (2.3) cm. long exclusive of awns; flowering glumes 7–10 mm. long, often awned or awn-pointed; rays of the panicle 2–5.
b. Flowering glumes broadly elliptical to suborbicular, firm (firm also in no. 5), glabrous or strigose-scabrous; awn not longer than the body of the glume; the lower empty glume 3–5-nerved, the upper one 5–9-nerved; annuals or biennials in cultivated fields and waste places.
c. Sheaths glabrous except the lowermost; flowering glumes 7–8 mm. long, all nearly equal, spreading at maturity with inrolled margins and thus exposing the rhachilla; panicle at maturity loose with spreading branches. 1. *B. secalinus*
c. Sheaths pubescent; flowering glumes with flat margins, usually remaining imbricated.
d. Flowering glumes 7–8 mm. long, all about equal, very broad, scarcely appressed; awns wanting; spikelets broadly oval. 2. *B. brizaeformis*
d. Flowering glumes 8.5–9.5 mm. long (the lower ones), conspicuously decreasing in size upward, appressed; awns about equaling the body; spikelets elliptic-lanceolate. 3. *B. commutatus*
b. Flowering glumes narrower, lanceolate to elliptical, thinner (except in no. 5), often very hairy, frequently longer-awned; annuals or perennials, often in wild situations.
c. Awns not exceeding the body of the flowering glume; perennials.
d. Lower empty glume 3-nerved; panicle small, 7–15 cm. long; spikelets very velvety all over. 4. *B. Kalmii*
d. Lower empty glume 1-nerved; panicle small or large; spikelets variously hairy.
e. Anthers (2.8) 3–4 mm. long; flowering glumes firm and somewhat involute, 3–4 mm. wide, inconspicuously nerved except at the summit, usually hairy over most of the dorsal surface, the pubescence variable in density; upper nodes usually exserted; flanges of the sheaths not apparent. 5. *B. purgans*
e. Anthers 1–2.5 mm. long; flowering glumes thin, papery; lateral nerves prominent to the base.
f. Flowering glumes moderately broad, 3.4–4 mm. wide, pubescent over much of the lower part, especially near the margin, the nerves rather strong; empty glumes usually pubescent; nodes usually all included; summit of the sheaths usually with a conspicuous flange and pilose ring; nodes glabrous except in the form with hairy sheaths. 6. *B. altissimus*

f. Flowering glumes narrow, 2.5–3.2 (3.4) mm. wide, strongly pilose near the margin, otherwise glabrous, the nerves weak; empty glumes glabrous, the nerves scabrous; upper nodes usually exserted at maturity; flange and pilose ring at orifice of sheath not apparent; nodes usually hairy. 7. *B. ciliatus*

c. Awns exceeding the body of the flowering glume; lower empty glume 1-nerved, upper one 3-nerved; annuals.

d. Awns 10–17 mm. long; flowering glume villous-strigose; panicle 6–15 cm. long, rather dense. 8. *B. tectorum*

d. Awns 20–30 mm. long; flowering glume scabrous; panicle 10–20 cm. long, broad and loose. 9. *B. sterilis*

a. Spikelets 2.5–3.5 cm. long; flowering glumes 10–12 mm. long, elliptic-lanceolate, thin, awnless or rarely with a very short awn; tall and coarse grasses, with an open 4–11-rayed panicle. 10. *B. inermis*

1. **B.** SECALINUS L. CHEAT. CHESS.

A weed on roadsides and in cultivated fields and waste places, in gravelly, rather fertile, soils; frequent and generally distributed. June 10–July 10.

Widely naturalized in temperate N. A. Native of Eurasia.

2. **B.** *BRIZAEFORMIS* Fisch. & Mey.

A weed on roadsides near the city sewerage pumping station (*C. T. Gregory*), where it has been observed for several seasons. June–July 10.

Mass. to Mich., southw. to Del. and Ind.; also, B. C. to Calif. and Colo. Adventive from Eu.

3. **B.** COMMUTATUS Schrad. (*B. racemosus* of Cayuga Fl.)

A weed on roadsides and in waste places, mostly in gravelly soils; frequent. June.

C. U. campus; streets, vacant lots, and railroad yards, Ithaca; near Coy Glen; near Taughannock Falls; Union Springs.

Widely distributed in N. A. Naturalized from Eu.

A related plant, *B. hordaceus* L., is frequent in eastern N. A. but has not been collected in the Cayuga Lake Basin.

4. **B. Kalmii** Gray.

Dry or damp woodlands and banks, also in meadows, mostly in calcareous soils; scarce. June 15–July.

Larch Meadow; Six Mile Creek, above the Sulphur Spring (*D.*!), near Green Tree Falls (*D.*), and near Beech Woods; Fall Creek, n. of Beebe Lake and back of Prudence Risley Hall; near Beaver Brook (*D.*); cliff talus s. of Willets.

Que. (?) and w. N. E. to Minn., southw. to N. J., Pa., and Mo.; rare or absent on the Coastal Plain.

The swamp plants should be studied further, as their habitat is peculiar for this species.

5. **B. purgans** L. (*B. ciliatus*, in part, and var. *purgans*, of Cayuga Fl.) BROME-GRASS.

Damp or rather dry rocky woodlands and cliffs, in fairly rich gravelly or stony, usually calcareous, soils; frequent. July–Aug. 15.

Enfield Glen; Slaterville Swamp; Coy Glen; Six Mile Creek; Cascadilla woods; Fall Creek; Shurger Glen; Salmon Creek; Taughannock Gorge; Paine Creek; Big Gully; woods, Junius marl ponds; not collected in the McLean district.

N. H. and e. Mass. to Wis., southw. to Fla. and La. (Tex.?); a few stations on the Coastal Plain.

The form with glabrous sheaths (forma *laevivaginatus* Wiegand) is frequent. The form with glabrous flowering glumes (forma *glabriflorus* Wiegand) has been found at the following stations: ravine opposite Beech Woods, Six Mile Creek, 1916

(*F. P. Metcalf*, type station): hummocks in and around Slaterville Swamp, 1919; wet hillside, n. side of Fall Creek, Varna, 1918 (*A. Gershoy*). (See Rhodora **24**: 92. 1922.)

6. **B. altissimus** Pursh. (*B. ciliatus*, in part, of Cayuga Fl.) BROME-GRASS.

Alluvial stream banks; rather common. July 20–Sept. 10.

North Spencer; Enfield Glen; Coy Glen; bank of Inlet s. of Ithaca; Six Mile Creek; Cascadilla Glen; Renwick woods; Fall Creek, above Forest Home, near Etna, and near Freeville; Myers Point; Salmon Creek, n. of Ludlowville.

N. Me. and w. Conn. to Nebr. (Mont.?), southw. to Pa. and Mo., but wanting on the Coastal Plain. Probably a plant of the rich lands of the interior.

A form with the sheaths villous is forma *incanus* (Shear) Wiegand (see Rhodora **24**: 91. 1922. *B. purgans*, var. *incanus* Shear). It is occasional, as in Fall Creek above Forest Home (*F. P. Metcalf & L. H. MacDaniels*), and west of Freeville.

7. **B. ciliatus** L. (*B. ciliatus*, var., no. 1256 of Cayuga Fl.) BROME-GRASS.

Boggy meadows and springy places, in marl or strongly calcareous soils; frequent. July–Aug.

Swamp along the creek above Enfield Falls; spring, s. side of Coy Glen; Fall Creek (*D.* in C. U. Herb.); Forest Home (*D.* in C. U. Herb.); e. of Slaterville; Mud Creek, Freeville; McLean Bogs (*D.*!); Beaver Brook; Lake Como (Locke Pond, *D.*); Salmon Creek, two miles n. of Ludlowville; Lowery Ponds; Spring Lake.

Lab. and Newf. to B. C., southw. to N. Y., Pa., Minn., Nev., and Oreg., but rare on the Atlantic Coastal Plain.

The form with glabrous sheaths (forma *denudatus* Wiegand) is occasional.

8. **B.** TECTORUM L.

Waste places, in dry sandy or gravelly soils; rare, and very recently introduced.

Railroad yards, Ithaca, 1924 (*W. C. Muenscher*); in gravel, Renwick, 1919; Cayuga, 1915 (*F. P. Metcalf*).

Me. to Ill., southw. to Md. and Mo.

Adventive. Native of Eu.

9. **B.** STERILIS L.

A weed of dry or damp gravelly waste places and roadsides; rare. June–July.

Dooryard, E. State St., and waste soil, Quarry St., Ithaca; gravelly soil along shore, Taughannock Point, 1884 (*F. V. Coville, D.*), now fairly abundant there; Interlaken (*W. A. Bassett*).

Mass. to Ill. and Colo., southw. to D. C. and Ark.; also on the Pacific coast.

Naturalized from Eu.

10. **B.** INERMIS Leyss.

Roadsides, fields, and banks, in rich soils; becoming frequent about Ithaca. June–July 15.

Slaterville Swamp; C. U. campus, in several places; Fall Creek flats, Forest Home; old railroad embankment, Renwick slope; field near McLean Bogs.

Escaped from cultivation. Introduced from Eu.

2. **Bromelica** (Thurb.) Farwell

1. **B. striata** (Michx.) Farwell. (See Rhodora **21**: 76 and 215. 1919. *Avena striata* of Cayuga Fl. *Melica striata* of authors.) PURPLE OAT.

Dry or damp open woodlands, in gravelly, more or less calcareous, soils; frequent. May 20–June 20.

S. of Perry City; Six Mile Creek; e. of Slaterville; McLean Woods; and elsewhere.

Newf. to Minn. and B. C. (?), southw. to Pa. and Colo.

The division by Farwell of the genus Melica into Melica and Bromelica seems to be justified. *B. striata* and its relatives have little in common with the true Melicas, in which the glumes are awnless, usually broad and blunt, and the upper ones generally convolute about each other.

3. **Festuca** L.

a. Plants wiry, often low; leaves mostly basal, very narrow, involute or filiform; awns usually present; branches of the panicle solitary, or rarely some in 2's.
  b. Plants annual, not cespitose; flowering glumes very narrow, 0.2–0.6 mm. wide when folded; stamen 1; inflorescence generally narrow, spike-like.
    c. Flowering glumes 2.5–4.5 mm. long, the awn not longer than the body; culms 0.2–0.7 mm. in diam. 1. *F. octoflora*
    c. Flowering glumes 5–6 mm. long, the awns twice the length of the body or more; culms 0.8–1.2 mm. in diam. [*F. myuros*]
  b. Plants perennial, more or less cespitose; flowering glumes 0.5–0.9 mm. wide when folded; stamens 3; inflorescence generally more ovate-oblong.
    c. Flowering glumes 3–3.8 mm. long, awnless; spikelets 5–8 mm. long; leaves capillary. 2. *F. capillata*
    c. Flowering glumes 4–5 mm. long, short-awned; spikelets 7–10 mm. long; leaves narrow but not capillary.
      d. Basal sheaths whitish, not shredded; plant very glaucous, densely cespitose. 3. *F. ovina*
      d. Basal sheaths rufous, shredded; plant less glaucous and less densely cespitose, often substoloniferous. 4. *F. rubra*
a. Plants tall and leafy; leaves broad and flat; awns wanting.
  b. Flowering glume 5–7 mm. long; spikelets 9–25 mm. long; panicle branches solitary or in 2's, short. 5. *F. elatior*
  b. Flowering glume 4–4.5 mm. long; spikelets 5–7 mm. long; panicle branches mostly in 2's, very long, spikelet-bearing at the tip. 6. *F. nutans*

1. **F. octoflora** Walt. (*F. tenella* of Cayuga Fl.)

Dry sandy or gravelly banks, in neutral or acid soils; infrequent. May 25–June.

State road n. side of Enfield Glen; Cascadilla woods (*D.*); Fall Creek woods (*D.*); old street railway grade, Renwick slope; ravine s. of McKinneys; Esty Glen, and ravines northw.; Taughannock Gorge (*D.*).

W. Que. to B. C., southw. to Fla., Tex., and Calif., including the Atlantic Coastal Plain.

[**F.** MYUROS L.

Roadside near Bailey Hall, 1922 (*C. L. Pratt*).

Native of Europe.]

2. **F.** CAPILLATA Lam. (See Rhodora **18**: 235. 1916. *F. ovina*, in part, of Cayuga Fl. *F. ovina*, var. *capillata*, of authors.)

Lawns and shaded walks, in light soils; rare. June.

President White Place, 1882 (*D.* in C. U. Herb.).

Newf. to Mich., southw. to N. J., including the coastal region.

3. **F.** OVINA L. (*F. ovina*, in part, and *F. duriuscula*, of Cayuga Fl.) SHEEP FESCUE.

Lawns, roadsides, and fields, preferably in sandy or gravelly soils; frequent. May 20–June.

Various places about the city, on C. U. campus, and on Cayuga Heights, where it has escaped from cultivation as a lawn grass. It occurs occasionally in woods (possibly native, *D.*) n. of King Ferry (*D.*), at Utt Point (*D.*), and on the banks of Cayuga Lake n. of Union Springs (*D.*) and Aurora (*D.*).

Widely introduced in N. A. from Eu., but probably native farther north.

4. **F.** RUBRA L. RED FESCUE.

Roadsides, in sandy or gravelly soils; scarce. June.

Parkway, Cayuga Heights, near both ends of the street, where it was probably introduced with grass seed; Taughannock Point; Sheldrake; and probably elsewhere.

Widespread as an escape in the Eastern States, but native farther north. Introduced from Eu.

The strain that occurs here, as also that in the fields of eastern Mass., resembles very much the form of *F. ovina* common in these two localities, but differs plainly in the characters given. The stoloniferous feature of *F. rubra*, emphasized by most authors, is usually not apparent except in lawns; elsewhere the plants are distinctly tufted, though less densely so than in *F. ovina*.

5. **F.** ELATIOR L. MEADOW FESCUE.

Yards, roadsides, and fields, in rich soils; common. June.

General throughout most of N. A. Introduced from Eu. as a fodder grass.

6. **F. nutans** Spreng.

Rather dry, often rocky, woodlands, usually in rich humus but often in rich gravelly soils or in alluvium, the lime preference not understood; common, and generally distributed. May 20–June.

N. S. to Minn., southw. to Fla. and Tex., but infrequent on the Coastal Plain.

4. Glyceria R. Br.

a. Spikelets 2–7 mm. long, ovate or oblong.
 b. Panicle contracted, linear, 1.5–3 dm. long; spikelets 1.5–2 mm. wide. 1. *G. melicaria*
 b. Panicle open, lax.
  c. Spikelets 3–4 mm. wide; nerves of the flowering glumes rather inconspicuous. 2. *G. canadensis*
  c. Spikelets 2.5 mm. wide or less; flowering glumes strongly nerved.
   d. Second empty glume 1 mm. long; spikelets short, 3–4 mm. long.
    e. Flowering glumes 1.2–1.9 mm. long; panicle 15–25 cm. long; spikelets green or purple. 3. *G. nervata*
    e. Flowering glumes 2–2.3 mm. long; panicle 8–14 cm. long; spikelets purple. 3a. *G. n.*, var. *stricta*
   d. Second empty glume 2–2.5 mm. long; spikelets 4–7 mm. long.
    e. Panicle 15–40 cm. long, diffuse, usually purple; leaves 6–15 mm. wide; culms 10–20 dm. high, erect. 4. *G. grandis*
    e. Panicle 5–12 cm. long, sparingly branched, pale; leaves 2–8 mm. wide; culms 3–10 dm. long, decumbent at base, often floating.
     f. Larger leaves 4–8 mm. wide; sheaths loose; panicle branches ascending; anthers cylindrical, 0.6–1 mm. long; grain 1.5 mm. long. 5. *G. pallida*
     f. Larger leaves 2–3 mm. wide; sheaths close; panicle branches divergent or reflexed; anthers globose, 0.2–0.5 mm. long; grain 0.8 mm. long. 6. *G. Fernaldii*
a. Spikelets 10–40 mm. long, narrowly cylindrical.
 b. Flowering glume obtuse, equaled by the palet.
  c. Spikelets 1.5–2 cm. long, subsessile; flowering glume hispidulous all over. 7. *G. septentrionalis*
  c. Spikelets 1–1.5 cm. long, pedicelled; flowering glume hispidulous only on the nerves. 8. *G. borealis*
 b. Flowering glume acute, much exceeded by the palet. 9. *G. acutiflora*

1. **G. melicaria** (Michx.) Hub. (See Rhodora **14**: 186. 1912. *G. elongata* of Cayuga Fl. *G. Torreyana* of authors.)

Deep mucky swamps or near-by ditches, in calcareous regions; rare. July.

Cayuta Lake, n. end; Caroline, swamp s. of depot and run n. of Bald Hill; swamp n. e. of Slaterville; Freeville Bog; n. of Freeville? (*D.*); Chicago Springs; w. of Lake Como? (Locke Pond, *D.*)

Que. to Minn., s. to Pa. and Ky., and in the mts. to N. C.; rare on the Coastal Plain.

2. **G. canadensis** (Michx.) Trin. RATTLESNAKE GRASS.

Boggy and mucky marshes and borders of swamps, usually in noncalcareous places but at Spencer in the presence of lime; scarce. July–Aug. 10.

Spencer Lake; Summit Marsh; springy open run n. of Bald Hill, Caroline; springy pasture one-half mile n. of Caroline Center; McLean Bogs; shore of Phillips Pond.

Newf. to Minn., southw. to N. J. and e. Kans., including the Coastal Plain. Large specimens are *G. laxa* Scribn., but they do not constitute a separate race.

3. **G. nervata** (Willd.) Trin. PANIC-GRASS.

Swales, wet fields, and along streams, usually near the borders of woods, mostly in muck and in neutral or somewhat calcareous soils; very common. May 15–June.

Newf. to B. C., southw. to Fla. and Mex., including the Atlantic Coastal Plain.

In woodlands the panicles are often green and have smaller spikelets, which are 2–3 mm. long instead of 3–4 mm. long, and 3–4-flowered instead of 4–7-flowered. This is var. *parviflora* Peck (Rept. N. Y. State Bot. **46**: 53 [133]. 1893).

3a. **G. nervata** (Willd.) Trin., var. **stricta** Scribn.

Open marshy places, mostly calcareous; apparently infrequent.

Collected only in a pasture on South Hill and at Mud Pond, McLean Bogs, but probably more common.

Range not clear.

The ecological and taxonomic value of these variations of *G. nervata* is not apparent. The var. *stricta* Scribn. is here interpreted as a coarser plant rather than a dwarfer plant.

4. **G. grandis** Wats. (*G. arundinacea* of Cayuga Fl.) REED MEADOW GRASS.

Meadows, ditches, and marshes, mostly in more or less calcareous or saline soils; common, and generally distributed. June 15–July 15.

E. Que. to Alaska, southw. to Pa., Colo., and Nev.; less frequent along the Atlantic coast.

5. **G. pallida** (Torr.) Trin. (*G. pallida*, in part, of Cayuga Fl.)

Shallow water of swamps and ditches, in acid, neutral, slightly calcareous, or brackish regions; rare. May–June.

"Marsh near head of Cayuga L. by C. S. R. R. July 1, 1882" (*D.* in C. U. Herb.!); near Black Lake, 1919 (*A. J. E., K. M. W., & L. F. Randolph*).

N. S. to Mich., southw. to Va. and Miss., including the Coastal Plain.

Flowering earlier than the next following species, according to St. John. Measurements for the spikelets, as given by St. John, do not hold well in this flora.

6. **G. Fernaldii** (Hitchc.) St. John. (See Rhodora **19**: 75. 1917. *G. pallida*, in part, of Cayuga Fl.)

Shallow water of bogs and boggy marshes, usually in calcareous regions; scarce. July–Aug.

Slaterville Swamp; n. of Caroline Center; marly marsh, e. end of Dryden Lake; Beaver Brook; moor of Mud Pond, McLean Bogs.

Newf. to Minn., southw. to Conn. and N. Y.; at least occasional on the Coastal Plain.

7. **G. septentrionalis** Hitchc. (*G. fluitans*, in part, of Cayuga Fl.)

Ditches on alluvial flats, and in mucky swamps; rare. June 15–July.

N. e. of Negundo Woods (*A. J. E. & A. Gershoy*); near the Ithaca fair grounds (*C. Chupp*); 2½ miles n. w. of Waterloo (*K. M. W., A. J. E., & L. F. Randolph*).

N. E. to B. C., southw. to N. C., La., and Tex., including the Atlantic Coastal Plain.

8. **G. borealis** (Nash) Batch. (*G. fluitans*, in part, of Cayuga Fl.)

Shallow water of boggy ditches and marshes, in calcareous regions; scarce. June 15–July.

Summit Marsh (*D.*!); Jennings Pond; Dryden-Lansing Swamp? (*D.*); Chicago Bog; Cortland marl ponds (*D.* in C. U. Herb.); Montezuma Marshes.

Newf. to Alaska, southw. to N. Y., Minn., Iowa, Colo., and Oreg.

9. **G. acutiflora** Torr.

Shallow water of boggy ditches and meadows, in slightly calcareous or even acid waters; scarce. June 15–Aug. 15.

Summit Marsh and vicinity; Jennings Pond; Slaterville Swamp; South Hill Marsh (*D.*!), and pond one-half mile s.; pool at foot of North Pinnacle, Caroline: Ringwood Swamp; "marsh near the lake" (*D.*).

Me. to Ohio and Del., including the Coastal Plain.

5. **Puccinellia** Parl.

a. Leaves of the culm 2–6 mm. wide, flat; panicle 8–20 cm. long; flowering glumes 2–2.5 mm. long. 1. *P. distans*

a. Leaves of the culm 2 mm. wide or less, becoming more or less involute; panicle 4–9 cm. long; flowering glumes 1.5–2 mm. long. 1a. *P. d.*, var. *tenuis*

1. **P.** DISTANS (L.) Parl.

Brackish meadows; rare. June–Aug.

Salty meadows e. of Montezuma village, where it is frequent. [Also at Syracuse, N. Y.]

Que. to N. Y., southw. to Del.; also in Nev. Naturalized from Eurasia and n. Africa.

1a. **P.** DISTANS (L.) Parl., var. TENUIS (Uechtritz) Fernald & Weatherby. (See Rhodora **18**: 12. 1916.)

Brackish meadows; rare. July–Aug.

Meadows along Salt Creek, Montezuma, 1893 (*W. W. Rowlee*).

N. B., Mass., N. Y., and Ont., to Wash. Naturalized from Eurasia.

In appearance this plant differs strikingly from *P. distans*.

6. **Poa** L.

a. Branches of the panicle solitary or in 2's; low annuals with small panicles; spikelets 4–5 mm. long; flowering glumes plainly 5-nerved, at least when dry; marginal and mid-nerves hairy. 1. *P. annua*

a. Branches of the panicle in 2's–5's; perennials.

b. Panicle rather narrow, the branches short, with clusters of spikelets at the axis; culms and sheaths compressed, 2-edged; rootstocks extensively creeping; plant blue-green. 2. *P. compressa*

b. Panicle broader and looser; culms and sheaths not markedly, if at all, compressed; rootstocks less prominent; culms usually more tufted.

c. Branches of the panicle in 2's.

d. Intermediate nerves of the flowering glume very distinct; the whole glume glabrous; anthers yellow; branches of the panicle nodding.

e. Flowering glumes obtuse, firm; anthers 0.6–0.8 mm. long; upper ligules 2–2.5 mm. long. 3. *P. debilis*

e. Flowering glumes acute, thinner; anthers 1–1.2 mm. long; upper ligules 0.3–1.5 mm. long. 4. *P. saltuensis*
d. Intermediate nerves obscure; midrib and lateral nerves hairy; anthers purple, 0.5–0.8 (1) mm. long; branches of the panicle not nodding. 5. *P. paludigena*
c. Branches of the panicle in (3's) 4's or 5's.
d. Flowering glume pubescent between the nerves, mostly obtuse, strongly 5-nerved; anthers purple, 1.6–1.8 mm. long; panicle silvery green, open, its branches more or less reflexed; ligule 1–1.5 (2.5) mm. long. 6. *P. sylvestris*
d. Flowering glume glabrous between the nerves, acute; branches of the panicle not reflexed.
e. Marginal nerves of the flowering glume glabrous, the keel hairy.
f. Intermediate nerves of the flowering glume obscure; spikelets 4–6 mm. long; anthers 0.4–0.7 mm. long, pink; ligule 1 mm. long or less; sheaths smooth; inflorescence silvery green, without spikelets close to the rhachis. 7. *P. alsodes*
f. Intermediate nerves prominent; spikelets 3.2–3.6 mm. long; anthers 1.6 mm. long, pale; ligule 5–6 mm. long; sheaths rough; inflorescence yellowish green or purplish, with normal rays and, in addition, many spikelets on short branches closer to the rhachis. 8. *P. trivialis*
e. Marginal nerves, and also the keel, of the flowering glume hairy; spikelets green or purple.
f. Intermediate nerves prominent; glumes 1.4–1.8 mm. wide; ligule 0.5–1.5 mm. long; anthers 1.4–1.5 mm. long, purple. 9. *P. pratensis*
f. Intermediate nerves obscure; glumes 1–1.4 mm. wide; anthers pale; panicle looser and often larger.
g. Ligule 0.5 mm. long; spikelets (3.5) 4–4.5 mm. long; anthers 1.2–1.4 mm. long; leaves spreading at right angles. 10. *P. nemoralis*
g. Ligule 2–4 mm. long; spikelets 2.5–4.5 mm. long; anthers 0.8–1 mm. long; leaves erect or ascending. 11. *P. palustris*

1. **P.** ANNUA L.

Lawns, cultivated grounds, and waste places, in moist, rich soils; common. April–Oct.

Nearly throughout N. A. Naturalized from Eu.

2. **P.** COMPRESSA L. CANADA BLUE GRASS. WIRE GRASS.

Dry banks, waste places, and the borders of woods, in rather sterile, mostly gravelly soil, or in cinders; common. June–Aug.

Almost throughout N. A. Naturalized from Eurasia.

Woodland forms have smaller spikelets and a more open inflorescence (var. *sylvestris* Torr.). This is clearly an ecological variation.

3. **P. debilis** Torr.

Dry open woodlands and scrubby banks, in sandy or gravelly, nearly neutral, soils, under oak, chestnut, or pine, rarely under maple or beech; frequent. May 15–June.

Thatcher Pinnacles; w. side of Cayuta Lake; hills s. of Mecklenburg; Cascadilla woods; Pleasant Grove Brook; glen between Renwick and McKinneys; n. of Esty Glen; Ringwood (*D.* in C. U. Herb.); Salmon Creek, n. of Ludlowville; n. of Genoa village; Lowery Ponds.

N. Y. and Ont. to Iowa.

4. **P. saltuensis** Fernald & Wiegand. (See Rhodora **20**: 122. 1918.)

In situations similar to the preceding, but possibly in more limy gravels, mostly under maple, beech, or pine; scarce. May 15–June.

Hilltop one mile n. of Caroline Center; s. corner of Dryden township; Ringwood; woods around Mud Pond, McLean Bogs (*K. M. W. & L. F. Randolph*); bank along e. side of Chicago Bog.

Newf. to w. Ont., southw. to Conn., Pa., and n. Mich.; not coastal.

This species replaces *P. debilis* in northeastern America.

5. **P. paludigena** Fernald & Wiegand. (See Rhodora **20**: 126. 1918. *P. sylvestris*, var. *palustris* Dudley, of Cayuga Fl.)

Boggy swamps, with marl and moss; frequent. June.

Headwaters Swamp; Michigan Hollow Swamp (*D.*); swamp along creek above Enfield Falls; Inlet Valley, near Ithaca-Newfield town line; Mud Creek, McLean Bogs (*D.*); Wyckoff Swamp (*D.*); Dryden-Lansing Swamp (*D.*); Westbury Bog.

Cent. N. Y., Mich., Ill., and Wis.

6. **P. sylvestris** Gray.

Hillside woodlands, in especially rich soil and humus; scarce. June.

S. of the mouth of Lick Brook; below Green Tree Falls (*D.*); ravine near Beech Woods, Six Mile Creek; Salmon Creek ravine, two miles n. of Ludlowville and w. of East Genoa.

N. Y. to Wis. and Nebr., southw. to Fla. and Tex. A plant of the rich soils of the Mississippi Basin.

7. **P. alsodes** Gray.

Rich damp woodlands, in gravelly calcareous soils; not uncommon. May 10–June 20.

Headwaters of Cayuga Inlet, Spencer; foot of Lick Brook Falls; Six Mile Creek; Fall Creek (*D.*); swamp e. of Slaterville; Freeville (*D.*); Mud Creek, Freeville; McLean Bogs; Beaver Brook (*D.*!); Taughannock Gorge; ravine at Elm Beach, Romulus; Howland Island; Spring Lake.

E. Que. to Minn., southw. to N. C. and Tenn., but rare or absent on the Coastal Plain.

8. **P.** TRIVIALIS L. ROUGH-STALKED MEADOW GRASS.

Roadsides, ditches, and elsewhere, in damp, rich, usually slightly calcareous, gravelly soil; common. June.

Generally distributed throughout the basin. "From the large number of swamp stations, it is probably indigenous in this region" (*D.*).

Newf. to Mich., southw. to Ga. and La. Generally considered naturalized from Eu.

9. **P.** PRATENSIS L. JUNE GRASS. KENTUCKY BLUE GRASS.

Fields, roadsides, and waste places, in rather dry rich calcareous soils; very abundant. June.

Everywhere common as an escape from cultivation. Native of n. and w. N. A. and Eurasia.

10. **P.** NEMORALIS L.

Dry gravelly, thinly wooded, banks with some clay, but the lime preference unknown; scarce. June.

Bank s. of Triphammer Bridge; yards, Fall Creek Drive; woods along Parkway n. of Upland Road, Cayuga Heights; woods one-half mile n. e. of Forest Home; woods e. of McLean Bogs.

Me. to Pa. and Minn. Naturalized from Eu.

A somewhat distinct form of this species is native in the Far North and the Far West.

11. **P. palustris** L. See Rhodora **18**: 235. 1916. *P. serotina* of Cayuga Fl. *P. triflora* of authors.) FOWL MEADOW GRASS.

Wet meadows (or often in drier situations, according to Dudley), frequently in somewhat acid soils but also in marl; very common. June–July.

Some dry-ground stations are: high banks near Ithaca Falls (*D.*); Cascadilla woods (*D.*); high hills in Danby and elsewhere (*D.*).

Newf. to B. C., southw. to N. J., Pa., Iowa, and Colo., including the northern Atlantic Coastal Plain. Found also in Eurasia.

7. **Eragrostis** Beauv.

a. Culms extensively creeping, forming mats; leaves 1.5–4 cm. long. 1. *E. hypnoides*

a. Culms erect or ascending; leaves, or some of them, more than 4 cm. long.

  b. Spikelets 2–4-flowered, about 2 mm. long.

    c. Panicle 15–40 cm. long, more than half the height of the plant; pedicels mostly 7–40 mm. long. 2. *E. capillaris*

    c. Panicle 5–12 cm. long, usually less than half the height of the plant; pedicels 2–6 mm. long. 3. *E. Frankii*

  b. Spikelets 5–many-flowered, 3 mm. long or more; panicle usually less than half the height of the plant.

    c. Spikelets 0.8-1.5 mm. wide.

      d. Pilose hairs at summit of sheaths present; panicle branches spikelet-bearing only on the upper two-thirds. 4. *E. pilosa*

      d. Pilose hairs at summit of sheaths wanting; panicle branches spikelet-bearing to near the base. 5. *E. peregrina*

    c. Spikelets 1.8–3 mm. wide.

      d. Flowering glumes densely imbricated, 2–2.2 mm. long; joints of the rhachilla not visible; spikelets 2.9 mm. wide. 6. *E. cilianensis*

      d. Flowering glumes loosely imbricated, 1.8 mm. long; joints of the rhachilla visible; spikelets 2 mm. wide. 7. *E. minor*

1. **E. hypnoides** (Lam.) BSP. (*E. reptans* of Cayuga Fl.)

Damp sandy or silty flats and shores, apparently not in acid soils; frequent. July–Sept.

Chiefly in or near Cayuga Lake Valley; Enfield Glen; Fall Creek, above and below Forest Home; Inlet Marshes; along the lake shore from Salmon Creek to the Canoga and Montezuma Marshes; region of Cortland marl ponds.

Vt. and Ont. to Wash., southw. to Fla. and Mex.

2. **E. capillaris** (L.) Nees.

Dry or damp gravelly banks or stream bars, in calcareous soils; rare. Aug.–Sept.

Enfield Glen; near Fall Creek Mills (*D.*); n. of the "Nook" (*D.*); mouth of Salmon Creek ravine (*D.*); Utt Point (*D.*).

N. H. to Kans., southw. to Ga. and Tex.; infrequent on the Coastal Plain.

3. **E. Frankii** (Fisch., Mey. & Lall.) Steud.

Fields and waste places; rare. Aug. 15–Sept.

Common in a cultivated field, Agricultural College farm e. of East Lawn Cemetery, 1919 (*A. J. E. & L. F. Randolph*); gravel bar, mouth of Big Gully Brook, 1918, probably this species.

Mass. to Minn. and Kans., southw. to Miss. and La. Introduced in the Cayuga Lake Basin.

House (Bul. N. Y. State Mus. 254: 111) cites "Ithaca, *W. R. Dudley*," but this species is not listed in Dudley's *Cayuga Flora* and there is no specimen collected by him in the C. U. Herb.

4. **E. pilosa** (L.) Beauv.

A weed on dry sandy or gravelly roadsides, in waste places, and in railway cinders; common, and generally distributed. July–Sept.

Mass. to Mich. and Kans., southw. to Fla., W. I., and Tex.; naturalized northw. Found also in Mex., Eu., and elsewhere.

Of rather recent introduction in the Cayuga Lake Basin, where it was not known at the time of publication of Dudley's *Cayuga Flora*.

5. **E.** PEREGRINA Wiegand. (See Rhodora **19**: 93, 1917, and **21**: 133, 1919.)

Dry waste places, in gravelly soil and cinders; rare. July 15–Aug.

D., L. & W. yards, 1914; L. V. R. R. yards n. of station, 1914–1918; railroad tracks of Central N. Y. Southern R. R., by Percy Field. [Also, Central N. Y. Southern R. R. yards in Auburn, 1918, *A. J. E.*]

Known from but few stations in e. U. S., Germany, and Japan, and in all these places a weed. Becoming more frequent in the Eastern States. Native land unknown.

6. **E.** CILIANENSIS (All.) Link. (See Rhodora **18**: 235. 1916. *E. major* of Cayuga Fl. *E. megastachya* of Gray's Man., ed. 7.)

A weed in dry gravelly waste places and by roadsides, not in distinctly acid soils; frequent. July–Sept.

Near Coy Glen (*D.*); streets of Ithaca (*D.*); cemetery, University Ave., Ithaca; various places on C. U. campus; near the "Nook" (*D.*); West Junius; and elsewhere.

Nearly throughout the U. S. and s. Canada; commonest southw. Naturalized from Eu.

7. **E.** MINOR Host.

In situations similar to those for the last-named species, or perhaps in less dry and slightly richer soils; locally common. July–Sept.

Abundant on the railroad tracks and roadsides about Renwick; C. U. campus; railroad yards, Cayuga.

N. E. to Pa. and N. Y. Naturalized from Eu.

Not known here at the time of publication of Dudley's *Cayuga Flora*.

8. Diplachne Beauv.

1. **D. maritima** Bicknell. (See Bul. Torr. Bot. Club **35**: 195. 1908. *D. fascicularis* of Cayuga Fl. *Leptochloa fascicularis* of Gray's Man., ed. 7. *D. procumbens* Nash.)

Low ground around salt springs; rare. July.

"Montezuma, near the salt well, also in pasture, near Salt Cr." (*D.*!).

Mass. southw. along the coast to Fla. and Tex., and from Ill. southw. along the Mississippi River.

As treated by Hackel and others, this species is considered generically distinct from Leptochloa and is placed in the Festuceae. An inspection of material of the various species in each genus seems to support this view.

9. Phragmites Trin.

1. **P. communis** Trin. REED GRASS.

In the larger marshes, perhaps under the influence of salt or lime from the underlying strata; locally abundant. Sept. 10–Oct.

Sparingly at Summit Marsh (*D.*!); "abundant throughout the Canoga, Cayuga and Montezuma Marshes" (*D.*!); Crusoe Bog.

N. S. to B. C., southw. to Fla. and Mex.; common along the coast. Found also in Eurasia.

10. Dactylis L.

1. **D.** GLOMERATA L. ORCHARD GRASS.

Fields, roadsides, and the borders of woods, in rich soil; common. June.

Often cultivated, and widely escaped. Native of Eu., now naturalized very generally in the U. S.

11. **Cynosurus** L.

1. **C.** CRISTATUS L. DOG'S TAIL GRASS.

Roadsides and grassland, in rich soil; rare. June–July.

E. of Cascadilla Place, Ithaca (*D.*); C. U. campus, e. of reservoir, 1914 (*C. C. Thomas*); Newman corner, Cayuga Heights, 1917; Wright lot, Upland Road, Cayuga Heights, 1920; doubtfully established.

Newf. to Ont., N. J., and N. Y. Adventive from Eu.

Tribe 2. *Hordeae*

12. **Agropyron** Gaertn.

a. Plants with creeping rootstocks; spikelets 3–7-flowered, loosely appressed to the axis of the spike. 1. *A. repens*

a. Plants without creeping rootstocks, more cespitose; spikelets 2–4-flowered, more closely appressed, and with thinner glumes. 2. *A. caninum*

1. **A.** REPENS (L.) Beauv. QUACK GRASS. COUCH GRASS.

Roadsides, cultivated fields, and gardens, in various soils; very common. July.

Range throughout N. A. except in the extreme North. Naturalized from Eurasia.

A pernicious weed, spreading rapidly by rootstocks. The awned form is especially frequent around salt springs.

2. **A. caninum** (L.) Beauv.

Dry banks and cliffs, in neutral or slightly acid soils; infrequent. July.

Caroline Pinnacles; Thatcher Pinnacles; hill near Slaterville Swamp; Enfield Glen; ravine n. of Lake View Cemetery; Fall Creek, above Forest Home; Renwick Road, Cayuga Heights; near Esty Glen; Taughannock Gorge, cliffs near the falls; Lowery Ponds.

Lab. to B. C., southw. to N. C., Wis., Nev., Ariz., and Calif.; rare on the Atlantic Coastal Plain.

Sheaths and blades glabrous, or with a varying amount of pubescence (forma *pubescens* (Scribn. & Sm.) Pease & Moore). According to Pease and Moore (Rhodora **12**: 61. 1910), the awns of the typical form are 7–15 mm. long. Plants with awns less than 6 mm. long are referred to var. *tenerum* (Vasey) Pease & Moore, and those with awns 1.5 cm. long or more, to var. *unilaterale* (Cas.) Vasey. These various forms occur in the Cayuga Lake Basin.

13. **Lolium** L.

a. Empty glume equaling or exceeding the upper flowering glume; rhachis of the spike at middle 2–2.8 mm. wide; culms at base 2–3 mm. in diam. 1. *L. temulentum*

a. Empty glume equaling the upper flowering glume or shorter; rhachis of the spike at middle 1.5–2 mm. wide; culms at base 1–2 mm. in diam.

- *b.* Flowering glumes awnless; rhachis of the spike with sides smooth, angles scabrous; empty glumes 5-nerved; leaves conduplicate.
  - *c.* Plants perennial, with tufted basal leaves; spikelets 5–8-flowered. 2. *L. perenne*
  - *c.* Plants annual probably, coarser and taller, generally without tufted basal leaves; spikelets 10–14-flowered. 2a. *L. p.*, var. *orgyiale*
- *b.* Flowering glumes short-awned; rhachis of the spike with sides as well as angles finely scabrous; leaves convolute.
  - *c.* Empty glumes 7-nerved; spikelets 10–20-flowered; plants coarse, annual, rarely with clustered basal leaves. 3. *L. multiflorum*
  - *c.* Empty glumes narrower, 5-nerved; spikelets 5–10-flowered; plants usually perennial, sometimes with clustered basal leaves; empty glumes more conspicuous. 3a. *L. m.*, var. *diminutum*

1. L. TEMULENTUM L. BEARDED DARNEL.

Waste places; rare. June–Aug.

City dump, Ithaca, 1922; probably elsewhere. Scattered through the U. S. and Canada. Adventive from Eu.

2. L. PERENNE L. COMMON DARNEL. RYE GRASS.

Lawns, roadsides, and fields, in rich soil; frequent. May–Oct.

Dryden Road, near Cascadilla Place, 1879 (*D.*); field s. of "Edgewood," rather abundant (*D.*); C. U. campus, e. of Dr. Law's (*D.*); Agricultural College campus; Cayuga Heights Road; and elsewhere.

Introduced generally in n. e. U. S. and s. Canada. Native of Eurasia.

2a. L. PERENNE L., var. ORGYIALE Doll.

Waste field, corner of Railroad and Willow Aves., Ithaca, 1919.

Native of Eu.

3. L. MULTIFLORUM Lam.

Lawn near Caldwell Hall, C. U. campus, Ithaca, 1916 (*F. P. Metcalf*).

Native of Eu.

3a. L. *MULTIFLORUM* Lam., var. *DIMINUTUM* Mutel.

Lawns and fields; occasional.

Various parts of the Agricultural College campus.

Native of Eu.

14. Elymus L.

a. Awns straight when mature and dry; palet 5.2–8 mm. long.
  b. Empty glumes broad (0.9–2 mm. wide), strongly indurated and more or less curved at base.
    c. Empty glumes (including the awn) 1–2.7 cm. long; flowering glumes (including the awn) 1–3 cm. long; spikes usually included at the base.
      d. Glumes glabrous and smooth, or scabrous on the margins only. 1. *E. virginicus*
      d. Glumes villous-hirsute. 1a. *E. virginicus*, var. *hirsutiglumis*
    c. Empty glumes 2.7–4 cm. long; flowering glumes (2.8) 3.5–4.5 cm. long; spikes exserted; glumes glabrous or slightly strigose-scabrous. 2. *E. australis*, var. *glabriflorus*
  b. Empty glumes narrow (0.4–0.8 mm. wide), often setiform, indurated and terete below, practically straight.
    c. Palet 7.5–8 mm. long; flowering glumes strigose-scabrous; joints of the rhachis 3–4.5 (rarely 5–8) mm. long; spikelets 2–4-flowered; blades and sheaths not hairy. 3. *E. riparius*
    c. Palet 5.2–6.7 mm. long; flowering glumes villous; joints of the rhachis 1.5–3 mm. long; spikelets 1(2)-flowered; blades and sheaths villous. 4. *E. striatus*
a. Awns curved outward toward the apex when mature and dry; palet 9–11 (15) mm. long; flowering glumes villous-hirsute.
  b. Leaves rather thin, very broad (13–20 mm. wide); spike slender and rather loose, pendent from the base; spikelets 4–7-flowered; empty glumes 15–20 (rarely 8–27) mm. long, narrow but not setiform, flat toward the apex; plants erect. 5. *E. canadensis*
  b. Leaves firmer, narrower (5–15 mm. wide), tending to be involute when dry; spike somewhat denser, arching; spikelets 2–5(usually 3–4)-flowered; empty glumes 20–25 (rarely 15–35) mm. long, usually broader and flatter; plants arching. 6. *E. robustus*, var. *vestitus*

1. **E. virginicus** L. WILD RYE.

Alluvial bottom lands and stream banks; frequent. July 15–Aug.

Cayuta Lake; along the railroad s. of Caroline Depot; Beebe Lake; Renwick flats and woods; Taughannock Gorge; McLean Bogs; and elsewhere.

Newf. to Mont., southw. to D. C., La., Tex., and Colo., including the Coastal Plain.

1a. **E. virginicus** L., var. **hirsutiglumis** (Scribn.) Hitchc.

In situations similar to the preceding; frequent.

Fall Creek, above and below Forest Home; Renwick marshes and woods; Myers Point; Union Springs; and elsewhere.

N. S. to Nebr., southw. to Pa. and Mo.

2. **E. australis** Scribn. & Ball, var. **glabriflorus** (Vasey) Wiegand.

Alluvial river banks; rare. July 15–Aug.

S. end of Negundo Woods, a large patch on e. side of creek, probably this species though approaching *E. virginicus*.

Mass. (Ayer), cent. N. Y., and from Md. and Tenn. to Nebr., southw. to Fla. and Tex.

3. **E. riparius** Wiegand. (See Rhodora **20**: 81. 1918. *E. canadensis* of Cayuga Fl., in large part.)

Stream margins and alluvial bottom lands, probably only in calcareous soils; common. July–Sept.

Generally distributed throughout the basin, but not collected from the foot of Cayuga Lake. The commonest species of Elymus in this flora.

Me. to N. Y. and Ky., southw. to Va. and W. Va.; rare or absent on the Coastal Plain.

4. **E. striatus** Willd. (Including var. *villosus* of Cayuga Fl.)

Rich rocky woodlands, and thickets on alluvial soils, mostly in calcareous districts; frequent. July 15–Aug.

Enfield Glen (*D.*); Negundo Woods (*D.*!); Renwick woods; near Indian Spring; Fall Creek, above Forest Home; near Shurger Glen (*D.*); shore of Cayuga Lake (*D.*!); talus on Cayuga Lake cliffs in Lansing and n. of King Ferry; w. of Canoga; near Salmon Creek (*D.*); Big Gully.

E. Mass. and Vt. to Wis., southw. to Del., Nebr., Kans., and Okla., and in the mts. to N. C.; rare on the Coastal Plain.

5. **E. canadensis** L.

Alluvial river banks, mostly in limestone regions; rare. Aug.

Bank of Inlet, in several places near Negundo Woods.

Que. to the interior of Me., N. H., Vt., w. Mass., n. Conn., n. and cent. N. Y., and n. Penn.

All the material from the Cayuga Lake Basin has glabrous foliage.

6. **E. robustus** Scribn. & Sm., var. **vestitus** Wiegand. (See Rhodora **20**: 81. 1918. *E. canadensis*, var. *glaucifolius*, of Cayuga Fl.)

Dry sandy or gravelly banks and cliffs, mostly in neutral or even slightly acid soils; locally common. Aug.–Sept.

In most of the ravines of the basin, and common along the east shore of Cayuga Lake.

N. B. and Me. to Oreg., southw. to Del., Mo., and Ariz.; less frequent on the Atlantic Coastal Plain.

15. Asperella Humb.

1. **A. Hystrix** (L.) Humb. (See Rhodora **14**: 187. 1912. *Hystrix patula* of manuals.) BOTTLE-BRUSH GRASS.

Dry or damp rocky or gravelly woodlands, in rich, usually calcareous, soils; frequent. July.

In nearly all the ravines of the basin; Mud Creek, Freeville; McLean Woods; Renwick slope; Utt Point; and elsewhere.

N. B. and N. S. to Minn., southw. to Ga., Ill., and Nebr.; practically absent on the Coastal Plain.

16. Hordeum (Tourn.) L.

1. **H.** JUBATUM L. SQUIRREL-TAIL GRASS.

A weed in waste places, mostly in gravelly soils with lime or salt; scarce. July.

"Old R. R. track, 20 rods s. of Sage College 1879" (*D.* in C. U. Herb.); near Agricultural College greenhouses; n. of Forest Home, near the Cornell poultry farm; Freeville; Ludlowville; Union Springs. Doubtfully established.

Atlantic coast from Lab. to N. J.; also from Ont. to Alaska, southw. to Tex. and Calif. Introduced sparingly elsewhere.

Tribe 3. *Aveneae*

17. Sphenopholis Scribn.

a. Flowering glumes scabrous all over; empty glumes subequal, the second one broadly obovate, obtuse; panicle looser than in no. 2. 1. *S. nitida*

a. Flowering glumes not scabrous; empty glumes unequal, the second one narrowly obovate, subacute; panicle dense, with more numerous spikelets. 2. *S. pallens*

1. **S. nitida** (Spreng.) Scribn. (*Eatonia Dudleyi* of Cayuga Fl.)

Dry or damp woodlands on steep slopes, in gravelly neutral or slightly acid soils with humus; frequent. June.

South Hill, 1882 (*F. C. Curtice,* D.); Six Mile Creek; Cascadilla woods, 1876 (*D.*); Renwick slope; McKinneys; Esty Glen; glen s. of Willets; s. of Mecklenburg; Big Gully. "Occurs in both dry and moist soil on most of our wooded ravine-slopes; occasionally in moist soil in more open places" (*D.*).

Vt. to Mich., southw. to Ga. and Miss.; occasional on the Coastal Plain.

2. **S. pallens** (Spreng.) Scribn. (*Eatonia pennsylvanica* of Cayuga Fl.)

Marshes, shores, and wet cliffs, here apparently always in limy places; frequent. June 20–July.

Enfield Glen; Slaterville Swamp; Buttermilk Glen; Six Mile Creek; Fall Creek; marsh near Indian Spring (abundant); Mud Creek, Freeville; shore of Mud Pond, McLean Bogs; Renwick slope; Esty Glen; Salmon Creek, on gravel bars; Paine Creek; moor of Junius marl ponds; Miller Bog, Spring Lake.

Newf. to Wis. and B. C., southw. to Ga., Kans., Tex., and Wash.; rare on the Atlantic Coastal Plain.

It has not been possible in this flora to separate var. *major* (Torr.) Scribn. from the typical form.

[**S. pennsylvanica** (L.) Hitchc. (See Rhodora **18**: 234. 1916. *Trisetum palustre* of Cayuga Fl.)

"Ithaca," (*Sartwell,* D.). Dudley says: "The specimen is a genuine *T. palustre,* but the species is not now known here." There may have been an interchange of labels.]

[**Avena** (Tourn.) L.]

[**A.** SATIVA L. COMMON OAT.

The common oat occasionally springs up in waste places or where it has been scattered from fodder, but it is not established.

Native of Eurasia.]

18. Arrhenatherum Beauv.

1. **A.** ELATIUS (L.) Beauv. OAT GRASS.

Roadsides and fields, in good soils; scarce. June.

N. and s. of Slaterville Springs; near McGowan Woods; C. U. campus (*D.* in C. U. Herb.!); Agricultural College greenhouses; Chi Psi grounds; Cayuga Heights Road, grounds of Sigma Chi fraternity; fairly abundant in Butler and Conquest.

Escaped from cultivation: Newf. to Minn., southw. to Ga., Tenn., and Nebr.; also on the Pacific coast. Naturalized from Eu.

19. Deschampsia Beauv.

a. Basal leaves setaceous, very numerous; sheaths scabrous; florets approximate; flowering glumes scabrous, the twisted awn much exserted. 1. *D. flexuosa*

a. Basal leaves flat or involute, less numerous; sheaths smooth; florets distant; flowering glumes smooth, the straight awn scarcely exceeding the body. 2. *D. caespitosa*

1. **D. flexuosa** (L.) Trin. HAIR GRASS.

Dry sandy, gravelly, or stony, noncalcareous or sometimes apparently calcareous, sterile soils; rare. June–July.

Caroline Pinnacles (*D.*!); hillside s. of Brookton; cliffs n. of King Ferry (*D.*); *Utt Point* (*D.*!).

Greenland and Newf. to Wis., southw. to N. J., N. C., and Tenn.; frequent on the Coastal Plain. Found also in Eu.

2. **D. caespitosa** (L.) Beauv.

Marly meadows and limy shores; rare. July 10–Aug. 10.

Spencer Lake (*K. M. W., A. J. E., & F. P. Metcalf*); Cortland marl ponds (*D.*!); Farley Point (*D.*); Utt Point (*D.*!).

Newf. to Alaska, southw. to n. N. J., Ill., Minn., and in the mts. to N. C. and N. Mex.; apparently absent on the Atlantic Coastal Plain. Found also in Calif. and Eu.

20. Ginannia Bub.

1. **G.** LANATA (L.) Hub. (See Rhodora **18**: 234. 1916. *Holcus lanatus* of Gray's Man., ed. 7, and of Cayuga Fl.) VELVET GRASS.

Fields and roadsides, in rather damp rich soils; becoming frequent. June–Aug. 15.

Field, Enfield Falls; several places about C. U. campus and farm; near Ringwood.

N. S. to Ill., southw. to N. C., Tenn., and Ill.; also on the Pacific coast. Naturalized from Eu.

21. Danthonia DC.

a. Leaves mostly basal, short; the cauline leaves with blades 8–14 cm. long, those at the base forming a curly mass when dry; culm terete; panicle short and rather dense (open only at anthesis), 5–6 cm. long. 1. *D. spicata*

a. Leaves more cauline, longer; those on the stem with blades 15–30 cm. long, the basal ones not curly; culm flattened; panicle longer and more open, 7–9 cm. long. 2. *D. compressa*

1. **D. spicata** (L.) Beauv. WILD OAT GRASS.

Dry sterile gravelly banks, hillsides, and old fields, mostly in acid soils, not found on the clays and richer soils; common. June–July 15.

Newf. to N. Dak., southw. to N. C., La., and Tex., including the Coastal Plain.

The lower sheaths vary from hairy to glabrous, and the teeth of the flowering glumes from 1 to 3 mm. in length, transitional forms being frequent. These characters are therefore of no value in separating the two species.

2. **D. compressa** Aust.

Open woods, old fields, and shores, in gravelly, mostly neutral, soil; infrequent. July.

In the shade of coniferous woods, North Spencer; near Danby (*D.*); hilltop one mile n. of Caroline Center; Turkey Hill (*D.*); Dart Woods (*D.*); high hills s. w. of Dryden Lake; shore of Dryden Lake (*D.*); woods, North Lansing; banks near Lake Como (Locke Pond, *D.*); very abundant w. of Etna.

N. S. to N. Y., southw. to N. C. and Tenn.; rare or absent on the Coastal Plain.

Tribe 4. *Agrostideae*

22. **Calamagrostis** Adans.

a. Summit of the sheath bearded; callus hairs about three-fourths the length of the flowering glume; spikelets about 4.5 mm. long; panicle usually contracted but not dense. 1. *C. perplexa*

a. Summit of the sheath glabrous; callus hairs about equaling the flowering glume; spikelets 2.5–5 mm. long.

b. Panicle open; empty glumes thin, slightly scabrous, acuminate, usually open in fruit; spikelets 2.5–3.5 mm. long; leaves flat in drying. 2. *C. canadensis*

b. Panicle contracted; empty glumes firmer, more scabrous, less acuminate, and usually closed in fruit; spikelets 3.5–5 mm. long; leaves involute in drying. 3. *C. hyperborea*

1. **C. perplexa** Scribn. (*Deyeuxia Porteri* of Cayuga Fl.)

Dry rocky woods, on subneutral sandstone residual soils; very rare. July–Aug.

N. w. crest and slope of Thatcher Pinnacles, Danby (*D.*!).

Reported elsewhere only from Piscataquis Co., Maine, but an inspection of that plant shows it to be not the same, and more like an offshoot of *C. Pickeringii*. The Danby plant is related to *C. Porteri*. (For notes on the Danby plant, see Cayuga Fl.; Rept. N. Y. State Mus. 41:58. 1888; U. S. Dept. Agr., Agrost., Bul. 11:26. 1898; and U. S. Dept. Agr., Agrost., Circ. 30:7. 1901.)

2. **C. canadensis** (Michx.) Beauv. (*Deyeuxia canadensis* of Cayuga Fl.) BLUE JOINT.

Meadows and marshes, in mucky soils; common. June 20–July.

Newf. to B. C., southw. to N. C., N. Mex., and Calif., including the Atlantic Coastal Plain.

3. **C. hyperborea** Lange.

Marl meadows; rare. July–Aug. 15.

Lowery Ponds, 1917 and 1919.

Newf. to B. C., southw. to Me., N. H., cent. N. Y., Mich., Ariz., and Wash.

The occurrence of this species here is peculiar, extending as it does the previously known range so far to the southward and so near to the type locality of *C. inexpansa* Gray (*C. confinis* of various authors) at Penn Yan, a species which has been found only doubtfully elsewhere. Other stations for *C. inexpansa*, especially those westward, are apparently not to be referred to typical *C. inexpansa*.

23. **Agrostis** L.

a. Palet half the length of the flowering glume or longer; panicle dense or open.

b. Ligule of the upper leaves 2–6 mm. long; spikelets dull and pale, or dull purple; panicle dense, or, if open, with many spikelets near the rhachis; plant pale, more or less glaucous.

c. Plant erect or slightly decumbent; panicle open; leaf blades 3–8 mm. wide. 1. *A. alba*

c. Plant strongly decumbent; panicle contracted, narrow; leaf blades 2–5 mm. wide. 1a. *A. a.*, var. *maritima*

b. Ligule of the upper leaves 0.5–2 mm. long; spikelets deeper, brighter, and richer in color, more glossy; panicle very loose, with capillary branches and without clusters of spikelets near the rhachis; leaf blades 1.5–2.8 mm. wide, commonly involute when dry; plant greener. 2. *A. tenuis*

a. Palet wanting; panicle very diffuse.

b. Branches of the panicle 2–7 cm. long, mostly flexuously and divaricately branched at or below the middle; spikelets scattered; culms usually much longer than the panicle; leaves 1–6 mm. wide, rather flat. 3. *A. perennans*

b. Branches of the panicle 6–12 cm. long, slender and straight, with appressed straight branches above the middle which are spikelet-bearing near the tips; culms from slightly longer to much shorter than the panicle, less leafy; leaves firmer, narrower (1–2 mm. wide), involute. 4. *A. hyemalis*

1. **A.** ALBA L. (*A. vulgaris,* in part, and *A. vulgaris,* var. *alba,* of Cayuga Fl.) RED TOP. BENT GRASS.

Fields, roadsides, and damp places, in heavy and light soils especially when neutral or slightly acid; very common. July.

Escaped from cultivation and widespread in N. A. Native of Eu. and possibly also of northern N. A.

Hitchcock (Bul. U. S. Dept. Agr., no. 772, 1920), Piper (Bul. U. S. Dept. Agr., no. 692, 1918), and Schinz all agree that *A. alba* L. is not an Agrostis but probably is *Poa nemoralis.* The next oldest name, *A. palustris* Huds., is not clearly the old *A. alba,* but, judging from the description, is probably *A. alba,* var. *maritima,* or some similar form. The name *A. alba* L. may be retained until the matter is settled.

1a. **A. alba** L., var. **maritima** (Lam.) G. F. W. Meyer. (*A. palustris* Huds., probably.) CARPET BENT GRASS.

Low grounds, in alluvial soils, especially in the vicinity of salt springs; frequent. July.

Fall Creek, above Forest Home; Ithaca flats, near the salt works, abundant; Taughannock Point; Farley Point; muddy strand opposite Cayuga village and n. of the village; salt pond e. of Montezuma; and elsewhere.

Range in N. A., and extent to which introduced, not definitely known. Occurs also in Eu.

2. **A.** TENUIS Sibth. (*A. vulgaris* of authors. *A. capillaris* L., possibly. *A. alba,* var. *vulgaris,* of Gray's Man., ed. 7.) RHODE ISLAND BENT GRASS.

Dry or damp pastures, in gravelly soil; infrequent. July.

Hillside pastures n. and n. w. of Caroline Center (*K. M. W., A. J. E., & L. F. Randolph*); near McLean Bogs; and probably elsewhere.

Naturalized from Eu.; perhaps also native.

Until it is decided whether *A. capillaris* L. is *A. vulgaris,* as held by Hitchcock and Schinz, or some other species, as held by several European botanists and by Piper, the next oldest name that unquestionably applies to the present species, *A. tenuis* Sibth., may be used.

The form with the flowering glume awned, forma *aristata* (Parnell) Wiegand (see Rhodora **26**:2, 1924, *A. vulgaris,* var. *aristata* Parnell, not *A. alba,* var. *aristata* Gray) occurs at Ringwood (*K. M. W. & A. Gershoy*), in a pasture one-half mile s. e. of McLean (*F. P. Metcalf*), and on a dry gravelly knoll e. of Malloryville Bog.

3. **A. perennans** (Walt.) Tuckerm. THIN GRASS.

Dry or damp open woodlands, in gravelly subacid or acid soils; not uncommon. July–Sept.

Dry Run, Spencer; hill woods, Buttermilk Glen; upper Coy Glen; Cascadilla woods; Fall Creek; e. of the Ithaca golf grounds, Cayuga Heights; s. w. corner of Cayuga Lake; Dryden Lake; Chicago Bog; sandy woods e. of Junius marl ponds; and elsewhere.

N. S. to Minn., southw. to N. J., Tenn., and Mo., including the northern Coastal Plain.

A complete series of transitional forms may easily be found between the coarser forms with straighter branches and more appressed spikelets, and the shade form with very divaricate zigzag capillary branches and scattered spikelets (*A. Schweinitzii* Trin.).

4. **A. hyemalis** (Walt.) BSP. (*A. scabra* of Cayuga Fl.) HAIR GRASS.

Dry or damp, sandy or gravelly, leached-out or acid, soils, in open fields, in borders of woods, and even in peat bogs; frequent. July.

Characteristic of sterile hillsides, exsiccated places, and old logs in swampy marshes; found mostly in the hills w., s., and e. of Ithaca, and in the McLean region; rare on the richer soil back from the shore of Cayuga Lake.

Nearly throughout N. A., except in the extreme North.

24. Cinna L.

a. Spikelets 5 mm. long; panicle dense; leaves large, 2–3 dm. long, (5) 8–20 mm. wide. 1. *C. arundinacea*

a. Spikelets 3–4 mm. long; panicle loose; leaves smaller, 1.5–2.5 dm. long, 5–10 (11.5) mm. wide. 2. *C. latifolia*

1. **C. arundinacea** L.

Swampy woodlands, in soils not strongly calcareous; frequent. Aug.

Cayuga Lake; Renwick woods (*D.*!); Fall Creek Gorge; swamps of Freeville and elsewhere (*D.*!); Spring Lake.

N. S. to Ont., southw. to Ga. and Tex., including the Coastal Plain.

2. **C. latifolia** (Trev.) Griseb. (*C. pendula* of Cayuga Fl.)

Shaded wet ravine banks and deep swamps, in calcareous regions; infrequent. July 15–Aug.

Michigan Hollow Swamp, delicate form (*D.*); Enfield Glen; Fall Creek Gorge (*D.*); Malloryville Bog; McLean Woods; Beaver Brook (*D.*!); Lake Como (Locke Pond, *D.*); Westbury Bog.

Lab. to Alaska, southw. to N. E., n. N. J., N. Y., the Great Lakes region, Colo., Utah, and Oreg., and in the mts. to N. C.; apparently absent on the Atlantic Coastal Plain. Found also in Eu.

25. Sporobolus R. Br.

1. **S. neglectus** Nash. (*S. vaginaeflorus* of Cayuga Fl.)

Roadsides and waste places, in sandy or gravelly sterile, mostly neutral, soils; becoming frequent. Sept.

Field, upper Coy Glen; Willow Ave., Ithaca; near Triphammer Falls (*D.*!); near Fall Creek Mills (*D.*); near Hanshaw Corners; "abundant on the lakeshore banks, near Ludlowville, Aurora, Sheldrake, etc." (*D.*); around the sulphur spring s. of Big Gully Point; and elsewhere.

N. B. to N. Dak., southw. to Va. and Tex.; rare or absent on the Coastal Plain.

S. vaginiflorus (Torr.) Wood is a plant of more acid soils, chiefly along the Atlantic coast and about the Great Lakes.

26. Alopecurus L.

a. Spikelets 5 mm. long; empty glumes acute; awn exserted about 5 mm. 1. *A. pratensis*

a. Spikelets 2–2.2 mm. long; empty glumes obtuse; awn very short, slightly exserted or included. 2. *A. aequalis*

1. **A.** PRATENSIS L. MEADOW FOXTAIL.

Fields and roadsides, in rich soils; rare. May 20–June 20.

"A few places on the campus" (*D.*!); near the Home Economics Building (*C. C. Thomas*); island in Fall Creek at Forest Home (*A. R. Bechtel*); salt flats, Montezuma (*K. M. W., A. J. E., & L. F. Randolph*).

Introduced from Eu. and naturalized in the Eastern States.

2. **A. aequalis** Sobol. (See House, Bul. N. Y. State Mus. 254: 94. 1924. *A. geniculatus*, var. *aristulatus*, of Gray's Man., ed. 7, and of Cayuga Fl.) FLOATING FOXTAIL.

Mucky ditches and marshes, the nature of the soil not clear; frequent. June.

Pool, foot of North Pinnacle, Caroline; n. of Slaterville Springs; Summit Marsh and vicinity; Michigan Hollow Swamp (*D.*!); South Hill Marsh (*D.*); Ringwood; Fall Creek, e. of Varna; Freeville Bog; West Dryden; Cortland marl ponds (*D.*!); Inlet Marshes (*D.*); Canoga Marshes (*D.*); Junius; Howland Island; near Duck Lake.

Gulf of St. Lawrence to Alaska, southw. to Md. and Calif.; rare on the Atlantic Coastal Plain. Found also in Eurasia.

27. Phleum L.

1. **P.** PRATENSE L. TIMOTHY. HERD'S GRASS.

Fields, roadsides, and other grassy places, in rich soil; very common. June.

Escaped from cultivation, and naturalized. Native of Eu.

At the second-growth flowering the spikelets are often viviparous (*Dudley* in Cayuga Fl.!).

28. Muhlenbergia Schreb.

a. Empty glumes minute, the first one obsolete or nearly so, the second one truncate; flowering glume long-awned; scaly rootstocks not apparent. 1. *M. Schreberi*

a. Empty glumes half the length of the flowering glume or more; rootstocks obviously scaly.

- *b.* Empty glumes broadly ovate, acute, one-half to two-thirds the length of the flowering glume.
  - *c.* Flowering glume awnless; spikelets 1.5–2 mm. long. 2. *M. sobolifera*
  - *c.* Flowering glume awned; spikelets 3–4 mm. long. 3. *M. tenuiflora*
- *b.* Empty glumes lanceolate, three-fourths the length of the flowering glume or longer.
  - *c.* Empty glumes unawned, but sometimes with a long acuminate tip projecting considerably beyond the flowering glume; panicle branched.
    - *d.* Internodes puberulent; sheaths close, usually embracing the internode; panicle more or less exserted, the branches not divaricate in anthesis.
      - *e.* Empty glumes lanceolate, three-fourths to seven-eighths the length of the long-awned flowering glume, somewhat silvery. 4. *M. sylvatica*
      - *e.* Empty glumes linear-lanceolate, slightly shorter or longer than the awnless or rarely awned flowering glume, less silvery. 5. *M. foliosa*
    - *d.* Internodes glabrous; sheaths loose and somewhat inflated, partly free from the internode; panicle generally partly included or very slightly exserted, the branches divaricate in anthesis. 6. *M. mexicana*
  - *c.* Empty glumes with a slender awn as long as or longer than the body; panicle very dense and spike-like, but interrupted, long-peduncled, usually livid. 7. *M. racemosa*

1. **M. Schreberi** J. F. Gmel. (*M. diffusa* of Cayuga Fl.) DROPSEED. NIMBLE WILL.

Roadsides, old orchards, borders of copses, and elsewhere, in rich gravelly soils; frequent. Aug.–Oct.

Various places throughout the city of Ithaca, on C. U. campus, in Forest Home, and on Cayuga Heights; also Genoa; and elsewhere.
Me. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

2. **M. sobolifera** (Muhl.) Trin.

Dry rocky places, especially in the ravines, in more or less calcareous soils; infrequent. Aug.-Sept. 15.
Fall Creek, near Ithaca Falls (*D.*!); Taughannock Gorge, below the falls; near Ludlowville (*D.*); "chiefly on the lake-shore declivities, where it grows in beds" (*D.*).
N. H. to Minn., southw. to Va., Tenn., and Okla.; probably absent on the Coastal Plain.

3. **M. tenuiflora** (Willd.) BSP. (*M. Willdenovii* of Cayuga Fl.)

Dry, rocky, thinly wooded slopes and gravelly hillsides, in less calcareous soils than the preceding; infrequent. Aug.
Thatcher Pinnacles; Enfield Glen; Six Mile Creek, at the Narrows (*D.*!); Beebe Lake; Paine Creek; Union Springs; and elsewhere.
Mass. to Minn., southw. to Ala. and Tex.; rare on the Coastal Plain.

4. **M. sylvatica** Torr.

Damp or rarely dry calcareous cliffs and ledges, more rarely in marl meadows; scarce. Aug. 15-Sept.
Buttermilk Glen; Six Mile Creek; Cascadilla Glen, near the Old Armory; Salmon Creek ravine, s. of Genoa; Big Gully; Westbury Prairie; swamp n. of Crusoe Lake.
N. B. to S. Dak., southw. to N. C. and Okla.; rare on the Coastal Plain.

5. **M. foliosa** Trin. (*M. mexicana*, var. *filiformis*, of Cayuga Fl.)

Damp thickets, in gravelly or stony, more or less calcareous, soils, occasionally in marl meadows; common. July 25-Sept.
Me. to S. Dak., southw. to Va., Ill., Okla., and Ariz.; rare or absent on the Coastal Plain.
The awned form, forma *ambigua* (Torr.) Wiegand (see Rhodora **26**: 1. 1924), occurs in Fall Creek in water under the sluiceway near Triphammer Falls (*F. P. Metcalf*).

6. **M. mexicana** (L.) Trin.

Damp shady roadsides and borders of thickets, in rich gravelly soils; frequent. Aug.-Sept.
Six Mile Creek; Cascadilla Glen; Fall Creek Gorge; Renwick; and elsewhere.
N. B. to S. Dak. and Wyo., southw. to N. C. and Tex.; perhaps less frequent on the Coastal Plain.
The awned form, forma *commutata* (Scribn.) Wiegand (see Rhodora **26**: 1. 1924), has been found at Renwick and near Indian Spring (*D.*), at "Ithaca" (*H. P. DeForest*), at Cayuga, and at Junius.

7. **M. racemosa** (Michx.) BSP. (*M. glomerata* of Cayuga Fl.)

Damp limy rocks, gravels, and marl meadows, rarely on dry rocks and in dry woods; frequent. July 25-Sept. 15.
Dry woods and cliffs, Thatcher Pinnacles (*D.*); Caroline Pinnacles (*D.*); wet shore of Spencer Lake; Larch Meadow (*D.*); Buttermilk Glen (*D.*); Malloryville Bog; McLean Bogs; wet cliffs, Salmon Creek; Spring Lake; Crusoe Prairie; and elsewhere (*D.*).
Newf. to B. C., southw. to n. N. J., Md., N. C., and N. Mex.; absent or rare on the Atlantic Coastal Plain.

29. **Dilepyrum** Michx.

1. **D. erectum** (Schreb.) Farwell. (*Brachyelytrum aristatum* of Cayuga Fl. *B. erectum* of Gray's Man., ed. 7.)

Ravines and low woodlands, in rich rocky or gravelly, somewhat calcareous, soils; frequent. June 20–July.

Enfield Glen; Six Mile Creek; Cascadilla woods; Fall Creek; Taughannock Gorge; McLean Bogs; Beaver Brook; and elsewhere.

Newf. to Minn., southw. to Ga. and Kans., with but few stations on the Coastal Plain.

Dudley's entry of var. *Engelmanni* was probably an error. Farwell (Amer. Mid. Nat. **8**: 33. 1922) has pointed out that the name *Dilepyrum* is the proper one for this genus, though his second argument, about glumes, seems not to hold. At any rate, the *Muhlenbergia* part of Michaux' genus already had a name, and *D. erectum* was the only unnamed element. It should retain Michaux' name.

30. **Milium** (Tourn.) L.

1. **M. effusum** L.

Low or wet woodlands, in gravelly or mucky rich calcareous soils; locally frequent. June.

Headwaters Swamp; Michigan Hollow Swamp (*D.*!); s. of Mecklenburg; Fall Creek, above Forest Home; Six Mile Creek; Slaterville Swamp; Mud Creek, Freeville; Malloryville Bog (*D.*); McLean Bogs (*D.*!); Beaver Brook (*D.*); Dryden-Lansing Swamp (*D.*); East Genoa; arbor vitae swamp e. of Clyde; Spring Lake; Crusoe Lake swamp; Westbury Bog.

Lab. to Ont., southw. to Mass., Pa., and Ill. Found also in Eurasia.

31. **Oryzopsis** Michx.

a. Spikelets, excluding the awn, 3–4 mm. long; leaves very narrow, involute. 1. *O. pungens*

a. Spikelets, excluding the awn, 6–9 mm. long.

- *b.* Leaves nearly all crowded at base of culm, long, linear, stiff and erect, glaucous; panicle 5–12 cm. long, contracted. 2. *O. asperifolia*
- *b.* Leaves scattered on the stem, broad and soft, green; panicle 7–25 cm. long, branches somewhat spreading. 3. *O. racemosa*

1. **O. pungens** (Torr.) Hitchc. (*O. Canadensis* of Cayuga Fl.)

Dry ravine crests, in sandy, perhaps slightly limy, soils; rare. May–June.

Taughannock Gorge, s. side below the falls (*F. C. Curtice*!) and on "Eagle Cliff" above the falls (*D.*); Shurger Glen, s. side (*K. M. W. & L. H. MacDaniels*).

Lab. to Pa., and westw. to B. C.; apparently including the northern Atlantic Coastal Plain.

2. **O. asperifolia** Michx.

Dry woods, ravine slopes, and hills, in gravelly, somewhat calcareous, soils; not uncommon. Apr. 20–May.

In nearly all the ravines of the basin, and in the less acid gravelly woods of the hills; also in the McLean region.

Newf. to B. C., southw. to Pa., Minn., and N. Mex.; occasional on the northern Atlantic Coastal Plain.

3. **O. racemosa** (Sm.) Ricker. (*O. melanocarpa* of Cayuga Fl.)

Dry or damp wooded ravine slopes and hillsides, in more or less calcareous soils; frequent. July 15–Aug. 10.

In nearly all the larger ravines of the basin; also on the Caroline Pinnacles.

Me. to Ont., southw. to Md. and Ky.; rare or absent on the Coastal Plain.

Tribe 5. *Chlorideae*

32. **Eleusine** Gaertn.

1. **E.** INDICA (L.) Gaertn. GOOSE GRASS.

Lawns and waste places; scarce. Aug.–Sept.

C. U. campus, main quadrangle, 1914 (*F. P. Metcalf*); Eddy St., Ithaca, 1916 (*F. P. Metcalf*), and Green St., 1918 (*A. J. E.*); Percy Field, 1908 (collector unknown).

Mass. to n. Ill., Kans., and Calif., southw. to tropical Am. Adventive from the Tropics of the Old World.

[**Beckmannia** Host]

[**B.** ERUCAEFORMIS (L.) Host.

N. end of drainage canal near the Ithaca fair grounds, 1918. Adventive from farther west, but doubtfully established.

Minn. and Iowa to Alaska, Colo., and Calif.]

33. **Spartina** Schreb.

1. **S. Michauxiana** Hitchc. (*S. cynosuroides* of Cayuga Fl.) CORD GRASS.

Low grounds, in silty, sandy, or gravelly soils, usually with at least a trace of salt; scarce. July–Oct.

Farley Point, a few (*D.*); rather abundant on the Cayuga Marshes n. of Black Lake (*D.*); Salt Pond w. of Howland Island.

Newf. to Sask., southw. to N. J., Tex., and Colo. Primarily a plant of the coast.

Tribe 6. *Phalarideae*

34. **Hierochloë** (Gmel.) R. Br.

1. **H. odorata** (L.) Wahl., var. **fragrans** (Willd.) Richter. (See Rhodora **19**: 152. 1917.) VANILLA GRASS. SWEET GRASS.

Calcareous marshy meadows on the Ontario plain, perhaps within the influence of salt springs; rare. May 15–June.

Crusoe Prairie, n. of Crusoe Lake, 1916 (*F. P. Metcalf, L. Griscom, & A. H. Wright*).

Along the coast, Newf. to N. J.; also inland from N. Y. through the Great Lakes region to Iowa and Colo.

35. **Anthoxanthum** L.

1. **A.** ODORATUM L. SWEET VERNAL GRASS.

Dry fields and roadsides, in gravelly, rather sterile, often acid, soils; frequent. May 15–June.

Generally distributed and often abundant on the hills s. and e. of Ithaca and in the McLean district; rare or absent on the clays and richer heavy soils about Ithaca and northw.

Nearly throughout N. A., but especially eastw. Naturalized from Eu.

36. **Phalaris** L.

a. Empty glumes wing-keeled; panicle oval, very dense. [*P. canariensis*]

a. Empty glumes not wing-keeled; panicle longer, composed of glomerules, open in anthesis.

  b. Leaves wholly green. 1. *P. arundinacea*

  b. Leaves striped with white. 1a. *P. a.*, var. *picta*

[P. CANARIENSIS L. CANARY GRASS.

"Appears nearly every year on the campus and in waste places near Ithaca. Not established" (*D.*); may be found in garbage dumps, springing from waste birdseed but not persisting.

Native of Eu.]

1. **P. arundinacea** L. REED CANARY GRASS.

Meadows, ditches, and other marshy habitats; frequent. June–July 10.

Spencer Lake and Summit Marsh; Fall Creek; Inlet Marshes; Utt Point; Spring Lake; Salt Pond w. of Howland Island; Lake Como; and elsewhere.

Newf. to B. C., southw. to N. J. and Colo.; less frequent on the Atlantic Coastal Plain. Found also in Eurasia.

1a. **P.** ARUNDINACEA L., var. PICTA L. RIBBON GRASS.

In damp dooryards, along roadsides, and on stream banks; occasional.

Escaped from cultivation: cove in Summit Marsh; "near steamboat landing" (*D.*); clay bank, athletic field, C. U. campus; e. of Varna, by the railroad (*D.*!); near Dryden Lake (*D.*); near Red Mill Pond (*D.*); Spring Lake; and elsewhere.

Native of Eurasia.

Tribe 7. *Oryzeae*

37. **Leersia** Sw.

a. Spikelets 2.5–3 mm. long; foliage smooth or nearly so; rootstocks short, thick, and very scaly. 1. *L. virginica*

a. Spikelets 4–5 mm. long; foliage very rough, retrorse-prickly; rootstocks slender and inconspicuously scaly. 2. *L. oryzoides*

1. **L. virginica** Willd. WHITE GRASS.

Rich damp shady sandy or gravelly soils, with no apparent relation to lime content; frequent. July 15–Aug.

Negundo Woods (*D.*!); near Indian Spring (*D.*); Renwick woods; Beebe Lake, s. side; Freeville (*D.*); ravine n. of Sheldrake; Big Gully; and elsewhere.

Me. to Ont., southw. to Fla. and Tex., including the Coastal Plain.

2. **L. oryzoides** (L.) Sw. CUT-GRASS.

Marshes, in alluvial and mucky soil with no apparent relation to lime content; common. Aug.

Lower Inlet Valley and Cayuga Lake marshes; Fall Creek, above Forest Home; Ringwood; Etna; McLean Bogs; and elsewhere.

Newf. to Oreg., southw. to Fla. and Tex.; common on the Atlantic Coastal Plain.

Tribe 8. *Zizanieae*

38. **Zizania** (Gronov.) L.

a. Pistillate flowering glumes thin and papery, dull, finely striate, scabrous over the whole surface; aborted spikelets slender and shriveled, less than 1 mm. thick; branches of the pistillate inflorescence 6–15 cm. long (exclusive of the spikelets), often spreading; leaves 10–50 mm. wide. 1. *Z. aquatica*

a. Pistillate flowering glumes firm and tough, with lustrous, closely corrugated surface, scabrous on the margins, at the summit, and sometimes along the nerves, otherwise glabrous; aborted spikelets 1.5–2 mm. thick; branches of the pistillate inflorescence 1.5–4.5 cm. long, appressed; leaves 4–10 mm. wide. 2. *Z. palustris*

1. **Z. aquatica** L. (See Rhodora **26**: 153. 1924. *Z. palustris* of Gray's Man., ed. 7.) WILD RICE.

Marshes, in rich mucky soil, perhaps influenced by salt springs; infrequent. Aug.
Near the mouth of Fall Creek; Inlet Marshes (*D.*); Cayuga Marshes (*D.*).
Me. to Fla. and La. (?) along the coast, also inland in N. Y. and Mich.

2. **Z. palustris** L. (*Z. aquatica* L., var. *angustifolia* Hitchc. *Z. aquatica* of Gray's Man., ed. 7, and in part, perhaps, of Cayuga Fl.) WILD RICE.

Shallow water; rare. July–Aug.
Jennings Pond (?); near the biological field station at mouth of Fall Creek, 1919 (*R. Hitchcock* and *A. R. Bechtel*).
N. B. to cent. N. Y., Ont., and Ind.
Linder (Rhodora **26**: 153. 1924) regards this as a variety of *Z. aquatica*, but in this region it seems distinct, especially with the added character of long and short branches of the inflorescence.

Tribe 9. *Paniceae*

39. **Digitaria** Scop.

a. First empty glume wanting, or minute and scarious; second one as long as the spikelet; pedicels subterete, glabrous or nearly so; leaves 3–6 mm. wide. 1. *D. Ischaemum*
a. First empty glume minute, herbaceous; second one half as long as the spikelet; pedicels angled and scabrous; leaves 4–10 mm. wide. 2. *D. sanguinalis*

1. **D.** ISCHAEMUM Schreb. (See Rhodora **18**: 231. 1916. *D. humifusa* of authors. *Panicum glabrum* of Cayuga Fl.) LOW CRAB GRASS. FINGER GRASS.

A weed of lawns, roadsides, and paths, in light or sandy soils; not uncommon. Aug.–Sept.
Streets of Ithaca; many places on C. U. campus; roads and lawns on Cayuga Heights; West Hill, Ithaca; Genoa; near Lowery Ponds; and elsewhere.
N. S. to S. Dak., southw. to Fla. and Kans. Naturalized from Eu.
A specimen from Cayuga Heights resembles one from Hannibal, Oswego Co., in having denser spikes.

2. **D.** SANGUINALIS (L.) Scop. (*Panicum sanguinale* of Cayuga Fl.) CRAB GRASS. FINGER GRASS.

A weed of light cultivated soils, roadsides, and waste places; very common.
Nearly everywhere in N. A., except in the extreme North.

40. **Paspalum** L.

1. **P. ciliatifolium** Michx. (*P. pubescens* Muhl., *P. Muhlenbergii* Nash, *P. pubescens*, var. *Muhlenbergii* House.)

Low sandy grassland; rare. Aug.–Oct.
Bordering the swamp in field e. of Lowery Ponds, 1922 (*W. C. Muenscher* and *K. M. W.*).
N. H. to Mo., southw. to Ga. and Miss., including the Coastal Plain.
The separation of species in Paspalum and Panicum on the basis of degree of pubescence is to be regretted. Fluctuation in pubescence is, at most, of only varietal importance.

41. **Echinochloa** Beauv.

a. Spikelets ovoid or oval; upper empty glume not awned; sheaths glabrous.
b. Spikelets not conspicuously bristly, the spicules short, slender, and comparatively soft; midrib of the upper empty glume with very short spicules; coriaceous flowering glume obtuse (tip withering); nodal hairs of the panicle long.

c. Spikelets oval, awnless and mostly pointless; spicules minute or almost wanting; panicle dense, usually dark purple; leaves, when well developed, 1.5–3 cm. wide. [*E. frumentacea*]

c. Spikelets elliptic-ovoid, acute or awned; spicules more prominent; panicle open, green or purplish; leaves 1.3 cm. wide or less. 1. *E. crusgalli*

b. Spikelets very bristly, the spicules long, stout, and spreading, those on the midrib of the upper empty glume scarcely shorter; coriaceous flowering glume acute or short-acuminate; nodal hairs short.

c. Spikelets 3.5–3.8 mm. long, 1.8–2 mm. in diam., some of them awned; panicle usually open, green or purple-tinged. 2. *E. muricata*

c. Spikelets 3–3.2 mm. long, 1.4–1.8 mm. in diam., awnless, rarely subulate-tipped; panicle usually more contracted, usually dark chocolate-purple. 2a. *E. m.*, var. *microstachya*

a. Spikelets ellipsoidal, long-awned; upper empty glume awn-pointed or short-awned; setae well developed on the branches of the spreading but densely flowered, usually purple-awned, panicle; sheaths hispid. 3. *E. Walteri*

[**E.** FRUMENTACEA (Roxb.) Link. JAPANESE MILLET. BILLION DOLLAR GRASS. Occasionally escapes from cultivation but does not become established. Native of s. Asia.]

1. **E.** CRUSGALLI (L.) Beauv. (*Panicum Crus-galli*, in part, of Cayuga Fl.) BARNYARD GRASS.

Cultivated fields, yards, and waste places, in damp rich soil; common. July 15–Sept. Widely distributed, mostly in e. N. A. Naturalized from Eu.

In the typical form a few spikelets bear short awns; the others are awnless. The form in which all the spikelets are long-awned (forma *longiseta* (Trin.) Farwell) also is common.

2. **E. muricata** (Michx.) Fernald. (See Rhodora **23**: 57. 1921. *Panicum Crus-galli*, in part, of Cayuga Fl.)

Alluvial marshes and bottom lands; frequent. Aug.

Spencer Lake; Fall Creek, gravel bar above Forest Home and gravel in Beebe Lake; Ithaca flats, both e. and w. of the Inlet; Etna; Marengo; and elsewhere.

Me. to Ill., southw. to Fla. and Okla. (N. Mex.?), including the northern Coastal Plain.

2a. **E. muricata** (Michx.) Fernald, var. **microstachya** Wiegand. (See Rhodora **23**: 58. 1921. *Panicum Crus-galli*, var. *muticum*, of Cayuga Fl.).

Low rich grounds along river banks and in other open grassy places, often in clay; frequent. July 15–Aug.

Wet clay bank of railroad cut, East Ithaca; e. of McLean station; border of West Marsh, Ithaca; Myers Point (*D.*); Krum Corners; near Union Springs (*D.*!); Cayuga (*D.*!); Canoga Marshes; Howland Island; Galen; salt flats, Montezuma (*D.*!).

Me. to S. Dak. and Utah, southw. to Conn., N. Y., Ill., and Mex; rare or absent on the Atlantic Coastal Plain. Found also in W. I.

The panicles are consistently much darker (except in occasional albino forms) than in the other species, except *E. frumentacea*.

3. **E. Walteri** (Pursh) Nash. (*Panicum Crus-galli*, var. *hispidum*, of Cayuga Fl.)

In the larger marshes; infrequent. Aug.

Inlet Marshes, both e. and w. of the Inlet (*D.*!); "Cayuga Marshes, where its large violet-colored panicles are very showy" (*D.*).

Along the coast from N. H. to Fla. and Tex., and inland about the Great Lakes. Found also in W. I. Perhaps influenced by the salt springs in cent. N. Y.

A form with glabrous sheaths (forma *laevigata* Wiegand) occurs occasionally, but has not been found within the limits of this flora.

42. Panicum L.

a. Basal leaves, if present, not differing from the cauline leaves.
  b. Plant hairy.
    c. Panicle not nodding; spikelets 4 mm. long or less.
      d. Spikelets acuminate, 2–4 mm. long, lanceolate or ovate-lanceolate; first empty glume acute, acuminate, or subaristate.
        e. Panicle large and broad when mature (15–40 cm. by 15–30 cm.), the branches spreading; leaves 5–10 mm. wide, finely and densely villous.
          f. Spikelets all or nearly all long-pedicelled, 2–3 mm. long; panicle tardily exserted, its lower branches mostly included during anthesis. 1. *P. capillare*
          f. Spikelets, except the terminal one, subsessile, 2.5–4 mm. long; panicle exserted in anthesis. 1a. *P. capillare*, var. *occidentale*
        e. Panicle smaller (10–20 cm. by 5 cm.), elliptical, the branches stiff and ascending; leaves 2–5 mm. wide, rather loosely villous. 2. *P. flexile*
      d. Spikelets obtuse or apiculate, 1.3–2.2 mm. long, elliptic to oval; first empty glume obtuse to subacute.
        e. Panicle broad (15–30 cm. long, or shorter in smaller plants, 12–20 cm. wide); spikelets 1.3–2 mm. long; leaf blades villous on both surfaces, long and narrow, 4–7 (8) mm. wide.
          f. Panicle long-exserted; spikelets mostly pedicelled; pulvini at base of branches of the panicle hairy. [*P. philadelphicum*]
          f. Panicle short-exserted or the base included; spikelets more spicate-racemose on the branches; pulvini glabrous, except sometimes on the upper side. 3. *P. Tuckermani*
        e. Panicle narrower, elliptic-oval, small (10–20 cm. long, 7–10 cm. wide); spikelets larger, 1.8–2.2 mm. long; leaf blades almost or quite glabrous, shorter, broader, (5) 6–10 mm. wide; plant much branched, with many axillary panicles. 4. *P. Gattingeri*
    c. Panicle nodding; spikelets 5 mm. long. 5. *P. miliaceum*
  b. Plant glabrous.
    c. Plant annual, much branched, decumbent; culms compressed, succulent; spikelets elliptic-lanceolate, acute. 6. *P. dichotomiflorum*
    c. Plant perennial, strict, erect, unbranched; culms rigid, terete; spikelets ovate, acuminate. 7. *P. virgatum*
a. Basal leaves short, broad, and ovate, forming a winter rosette.
  b. Leaves elongate-linear, erect, narrow (3 mm. wide), almost twenty times as long as wide, nearly all basal; plant low and tufted; spikelets tending to be contracted at the base.
    c. Spikelets 3–3.5 mm. long, acute or subacuminate, glabrous or nearly so; foliage nearly glabrous. 8. *P. depauperatum*
    c. Spikelets 2–2.5 mm. long, obtuse or obtusish.
      d. Sheaths pilose; spikelets pubescent. 9. *P. linearifolium*
      d. Sheaths glabrous; spikelets almost glabrous. 9a. *P. linearifolium*, var. *Werneri*
  b. Leaves linear-lanceolate or broader, not conspicuously elongated, scattered on the culm; plant less tufted, usually taller and more open; spikelets not contracted below.

c. Spikelets 2.5 mm. long or less; leaf blades less than 15 mm. wide.
d. Spikelets glabrous, elliptical; sheaths and blades glabrous. 10. *P. dichotomum*
d. Spikelets hairy.
e. Sheaths, or all but the lowest one, glabrous; ligule 1 mm. long or less; blades 7–14 mm. wide, firm, the margin narrowly white-cartilaginous; spikelets oval, 1.3–1.7 mm. long. 15. *P. sphaerocarpon*
e. Sheaths hairy.
f. Culms and sheaths with villous or hirsute pubescence; ligule 3–5 mm. long.
g. Spikelets 1.3–1.9 mm. long.
h. Axis of the panicle glabrous, or, at most, with a few appressed hairs; (leaf blades glabrous above or with a few pilose hairs, glabrous or pubescent beneath; upper sheaths glabrous or pilose; spikelets mostly 1.6–2 mm. long). 11. *P. Lindheimeri*, var. *septentrionale*
h. Axis of the panicle spreading-pilose, at least on the lower internodes; (upper sheaths usually pilose).
i. Spikelets 1.6–1.9 mm. long; leaf blades densely or loosely short-pilose or glabrous above, pubescent or glabrous beneath. 11a. *P. Lindheimeri*, var. *fasciculatum*
i. Spikelets 1.3–1.5 mm. long; leaf blades long-pilose above, with hairs mostly 3–6 mm. long; whole plant conspicuously long-pilose. 11b. *P. Lindheimeri*, var. *implicatum*
g. Spikelets (1.9) 2–2.2 mm. long; culms and sheaths copiously long- and somewhat matted-pilose; leaves pubescent beneath, copiously pilose above, the hairs as in no. 11a; branches of the panicle possibly less spreading than in no. 11a, which this species resembles. 12. *P. villosissimum*
f. Culms and sheaths crisp-puberulent.
g. Main leaves 3–10 mm. wide, puberulent beneath, with a few long hairs above; ligule 0.8–2 mm. long; spikelets 1.8–1.9 mm. long. 13. *P. tsugetorum*
g. Main leaves 8–15 mm. wide, glabrous on both surfaces; ligule almost obsolete; spikelets 2.2–2.5 mm. long. 14. *P. umbrosum*
c. Spikelets 2.7 mm. long or more; leaf blades 9–35 mm. wide.
d. Spikelets 2.7–3 mm. long.
e. Sheaths glabrous or nearly so; leaf blades 9–12 mm. wide. [*P. calliphyllum*]
e. Sheaths papillose-hispid; leaf blades 12–30 mm. wide. 17. *P. clandestinum*
d. Spikelets 3.2–4.5 mm. long.
e. Leaf blades strongly ascending or erect, scarcely auricled at base; spikelets obovoid, obtuse, strongly nerved.
f. Panicle contracted; leaves 10–20 mm. wide. 16. *P. xanthophysum*
f. Panicle open; leaves 6–12 mm. wide. [*P. macrocarpon*]
e. Leaf blades more or less spreading, 15–40 mm. wide, subcordate, clasping; panicle open; spikelets ellipsoidal, subacute, less strongly nerved.
f. Nodes strongly bearded; plant often pubescent; spikelets 4–4.5 mm. long. 18. *P. Boscii*
f. Nodes glabrous or puberulent; plant glabrous or nearly so; spikelets 3.5–3.8 mm. long. 19. *P. latifolium*

1. **P. capillare** L. OLD WITCH GRASS.

Sandy or gravelly cultivated fields, roadsides, and waste places, in the richer soils; common. Aug.–Sept.

Me. to N. Dak. and Colo., southw. to Fla. and Tex., including the Coastal Plain.

1a. **P. capillare** L., var. **occidentale** Rydb. (See Rhodora **21**: 110. 1919.)
Gravelly waste places and sandy or gravelly shores; common.
Spencer Lake; Enfield Glen; C. U. campus; Ithaca flats; Howland Island; especially characteristic along the shores of Cayuga Lake.
P. E. I. and Que. to B. C., southw. to Conn., Mich., Mo., and westw.
Very variable in size of spikelets.

2. **P. flexile** (Gat.) Scribn.
Marl meadows, moors, and shores; rare. Aug.–Sept.
Moor e. side of Lowery Ponds, 1922 (*W. C. Muenscher & K. M. W.*).
Ont. to S. Dak., southw. to Fla. and Tex.; rare or absent on the Coastal Plain.

[P. PHILADELPHICUM Bernh.
Found in 1914 near the farm-crops plots on the Agricultural College farm (*F. P. Metcalf & H. A. Severy*); probably sporadic.
Conn. and s. N. Y. to Ga., Miss., and Okla.]

3. **P. Tuckermani** Fernald. (See Rhodora *21*: 112. 1919.)
Sandy or gravelly shores and springy places, and on silty bottom lands, with little reference to lime content of the soil; infrequent. Aug.–Sept.
Spencer Lake; Fall Creek, above Forest Home; Ithaca flats, in Renwick woods and w. of the Inlet; Slayton Pond.
Que. and Me. to Wis., southw. to Conn. and N. Y., including the northern Coastal Plain.

4. **P. Gattingeri** Nash.
Rich gravelly or loamy cultivated fields, roadsides, and waste places, if not too dry; locally common. Aug. 20–Sept.
This and *P. capillare* are distinctly weeds of cultivated grounds. *P. Gattingeri*, however, occurs also on gravel bars in Fall Creek above and below Forest Home, and along Salmon Creek. Collections of *P. Gattingeri* in this flora are all from the Cayuga Lake Valley, and mostly from the vicinity of Ithaca.
N. Y. to Iowa, southw. to N. C., Tenn., and Mo.

5. P. MILIACEUM L. BROOM-CORN MILLET. PROSO.
Waste places, occasionally spontaneous. July–Aug.
Frequent on garbage dumps, where it springs from birdseed.
Me. to Ont., Pa., and Nebr. Adventive from Eu.

6. **P. dichotomiflorum** Michx. (*P. proliferum* of Cayuga Fl.)
Waste ground and cultivated fields, mostly within the influence of saline conditions; rare. July–Oct.
Cascadilla Creek, near Willow Ave., Ithaca, 1921 (*A. J. E., C. L. Wilson, & S. H. Burnham*); railroad yards w. of the Inlet, 1923 (*W. C. Muenscher*); "fields near the Salt Creek, Montezuma" (*D.*!). Introduced at the first two stations; probably native at the last-named station.
N. S. to Nebr., southw. to Fla. and Tex., including the Coastal Plain; also in Calif., Mex., W. I., and S. A.

7. **P. virgatum** L. SWITCH GRASS.
Gravelly, rather dry, but not acid soils; rare. Aug.–Sept.
Appearing as though introduced: scrubby plain s. of Potter Falls, Six Mile Creek, 1915 (*F. P. Metcalf* and *C. C. Thomas*); meadow between Willow Ave. and Mill St., Ithaca, 1916 (*F. P. Metcalf*). The earliest records are "Farley's Point, a *single cluster, 1881. 'Cayuga Marshes,' (Sartwell, in Paine's Cat.)*" (*D.*); but whether these plants were of the typical form or the variety is not known.

N. H. to Wyo., southw. to Fla. and Ariz., including the Coastal Plain. Found also in Mex. and Cent. Am.

The var. *spissum* Linder (see Rhodora **24**: 15. 1922) is not well defined in this flora.

8. **P. depauperatum** Muhl.

Dry sandy slopes and thickets, in the more acid soils; rare. June.

Junius, borders of woods e. of the peat bogs.

Me. to Minn., southw. to Ga. and Tex.; common on the Coastal Plain.

9. **P. linearifolium** Scribn.

Dry gravelly slopes and thickets, in sterile, somewhat acid, chestnut soils; frequent. June–July.

Not uncommon on the hills s. w., s., and s. e. of Ithaca, on the crests of the ravines, in the gravelly and stony soils along the shore of Cayuga Lake, and at Junius.

Me. to Kans., southw. to Ga. and Tex.; infrequent on the Coastal Plain.

9a. **P. linearifolium** Scribn., var. **Werneri** (Scribn.) Fernald. (See Rhodora **23**: 194. 1921. *P. Werneri* Scribn.)

In situations similar to the preceding, and with the same distribution, often growing with it; frequent. June.

N. S. to Minn., southw. to Ohio and Tex.; occasional on the northern Coastal Plain.

None of the characters mentioned by Scribner (Rhodora **3**: 118. 1901) as separating *P. Werneri* from *P. linearifolium* are constant in this region except the glabrous culms and foliage. Material at hand, of the two forms, is identical except for the difference in pubescence. In this character there is very little transition; yet, this being the only difference, it would seem better to treat the plant as a variety of *P. linearifolium*.

10. **P. dichotomum** L. (*P. d.*, var. *nitidum* and var. *viride*, of Cayuga Fl.)

Dry gravelly or sandy open hillsides and banks, and in open woods, mostly in acid chestnut soils; common. June 20–July.

On the chestnut soils of the hills w., s., and s. e. of Ithaca, on the ravine crests and the crests of the cliffs along Cayuga Lake, and in the sandy soil n. of the lake; rare or absent in the McLean district and on the clays and richer soils back from the lake shores.

N. B. to Mich., southw. to Fla. and Tex., including the Coastal Plain.

Plants in exposed situations often have firm leaves up to 9 mm. wide, whereas the shade forms have very narrow, more widely spreading, leaves.

11. **P. Lindheimeri** Nash, var. **septentrionale** Fernald. (See Rhodora **23**: 223. 1921.)

Dry or damp sandy or gravelly fields and banks, often apparently in calcareous soils; frequent. June 20–Aug. 10.

Coy Glen; near Forest Home; w. of East Lansing; Taughannock Gorge and Point; ravine s. of Genoa; gravel along shore s. of Union Springs.

N. S. to Man., southw. to Conn., N. Y., Ind., and Mo.; apparently rare on the Coastal Plain.

Three forms occur: (a) with leaves glabrous both above and beneath; (b) with leaves glabrous above but hairy beneath; and (c) with leaves hairy on both faces. This variety forms the greater part of the *P. tennesseense* of Gray's Man., ed. 7, and is part of the *P. dichotomum* of the *Cayuga Flora.* Several forms of this species have been treated as species but they are certainly not distinct. The treatment by Fernald is here followed, though it is not clear that the primary division should be made on the pubescence of the inflorescence rather than on that of the leaves. In the local specimens the glabrous or hairy upper and under surfaces of the leaves are fairly clear-cut characters showing almost no transition.

11a. **P. Lindheimeri** Nash, var. **fasciculatum** (Torr.) Fernald. (See Rhodora **23**: 223. 1921. *P. huachucae* and var. *silvicola* of Gray's Man., ed. 7. *P. tennesseense*, in small part, of Gray's Man. *P. dichotomum*, var. *pubescens*, in part at least, of Cayuga Fl.)

In situations similar to the preceding, though often in more acid soils; common. June 20–Aug. 10.

Newf. to B. C., southw. to Fla. and s. Calif., including the Atlantic Coastal Plain.

Three forms are found in New York State: (a) with leaves hairy both above and beneath; (b) with leaves hairy beneath but not above; and (c) with leaves glabrous on both faces.

11b. **P. Lindheimeri** Nash, var. **implicatum** (Scribn.) Fernald. (*P. implicatum* of Gray's Man., ed. 7. *P. dichotomum*, var. *pubescens*, in part, of Cayuga Fl.)

In situations similar to the last-named; frequent.

North Spencer; Cayuta Ravine; South Hill; hilltop n. of Caroline Center; Ringwood; McLean station and around McLean Bogs; near Townley Swamp; n. w. of Grotto; n. w. of Waterloo; n. of Montezuma village.

Newf. to Wis., southw. to N. Y. and Iowa.

More distinct than the other varieties, and more uniform.

12. **P. villosissimum** Nash.

Dry sandy sterile woods and hillsides, in acid soils; rare. June 10–July 10.

Junius, n. e. and s. of the peat bogs and e. of the marl ponds, locally abundant (first collection *E. M. Cipperly*, 1905).

Mass. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

Possibly not specifically distinct from *P. Lindheimeri* Nash, as its chief point of difference is the large spikelets which grade into those of *P. Lindheimeri*.

13. **P. tsugetorum** Nash.

Dry sandy or gravelly open woods, in acid soils; rare. July–Aug.

W. slope of Thatcher Pinnacles, 1916 (*F. P. Metcalf*); field s. w. of Junius bogs, 1919 (*A. J. E., K. M. W., & L. F. Randolph*).

Me. to Ill., southw. to Va. and Tenn., including the Coastal Plain.

Perhaps only varietally distinct from *P. heterophyllum*.

14. **P. umbrosum** Le Conte. (See Rhodora **14**: 173. 1912. *P. Ashei* Pearson. *P. nervosum* of Cayuga Fl.)

Dry sandy or gravelly open woodlands near the ravines, probably in acid soil; infrequent. July.

Near foot of hill, state road, n. of Enfield Glen; Coy Glen; near South Hill Marsh (*D.*); near White Church (*D.*); Cascadilla woods (*D.*); Fall Creek woods (*D.*).

Mass. to Mich., s. to Fla., Mo., and Miss., including the Coastal Plain.

Dudley's plants listed as *P. nervosum* were probably of this species, though specimens so named by him have not been seen. A specimen of this species in the C. U. Herb., collected by Dudley in Fall Creek Gorge, is labeled *P. pauciflorum* Ell. The type specimen of *P. Ashei* was collected by Ashe at Ithaca, July, 1898.

15. **P. sphaerocarpon** Ell. (*P. microcarpum*, var. *sphaerocarpon*, of Cayuga Fl.)

Borders of dry sandy woodlands and thickets, in acid chestnut soils; rare. June 25–July.

Woods near the marl ponds and also near Pout Pond, Junius; "woods near the road between the W. Junius ponds and Geneva" (*D.*); Junius (*House*).

Vt. to Ill., southw. to Fla., Mex., and Cent. Am.; common on the Atlantic Coastal Plain.

[**P. calliphyllum** Ashe.

Hitchcock says of *P. calliphyllum* (Contr. U. S. Nat. Herb. **15**: 178. 1910): "'Type material collected by the writer at Watkins, Lake Seneca, N. Y. Aug. 1898.' [Ashe.] The type could not be found in Ashe's herbarium. In the National Herbarium is a specimen collected by Ashe 'Near Ithaca, N. Y.' which Mr. Ashe has stated orally is from the published locality and is a duplicate type." This species has not since been found in central N. Y.]

16. **P. xanthophysum** Gray.

Dry sandy or gravelly open woods, in acid soils; rare. July–Aug. 10.

Thatcher Pinnacles (*D.*!); summit of South Pinnacle, Caroline (*D.*); "Danby, *Coville* in 1885" (*Hitchcock & Chase*).

Que. to Minn., southw. to Pa., including the northern Coastal Plain.

[**P. macrocarpon** Torr. (See Rhodora **14**: 184. 1912. *P. Scribnerianum* Nash.)

Hitchcock (Contr. U. S. Nat. Herb. **15**: 284. 1910) cites a specimen "Ithaca, *Ashe*." This species has not since been found here. Ashe's specimens of that period were sometimes labeled "Ithaca" or "near Ithaca" when they really came from Watkins (see above, under *P. calliphyllum*).]

17. **P. clandestinum** L.

Low woods and thickets along stream banks, usually in sandy, more or less acid or at least neutral, soils; rare. July–Aug.

Alluvial bottom land along the old southern stream bed of Fall Creek, Forest Home; Renwick woods (*W. W. Rowlee*); "border of the woods near the brook north of the 'Nook.' Possibly introduced here" (*D.*); n. of Montezuma village.

N. S. to Kans., southw. to Fla. and Tex., including the Coastal Plain.

18. **P. Boscii** Poir.

Gravelly banks in dry woods, in neutral or subacid soils; rare. July.

Coy Glen (*E. M. Cipperly*, 1904!, *F. P. Metcalf*, 1914); n. side of Beebe Lake, 1916 (*F. P. Metcalf*).

Mass. to Okla., southw. to Fla. and Tex., including the Coastal Plain.

The specimens listed above are pubescent, the Coy Glen plants very slightly and the Beebe Lake plants much more so (var. *molle* (Vasey) Hitchc. & Chase), but this distinction seems of little taxonomic importance.

19. **P. latifolium** L.

Dry open woodlands, in sandy or gravelly neutral or acid soils; frequent. June 20–July.

On the hills s. w. and s. e. of Ithaca, on the ravine crests and the crests of the lake cliffs, and in the sands n. of Cayuga Lake; rare or absent in the McLean region and on the clays and richer soils back from the lake shore.

Me. to Minn., southw. to N. C. and Kans.; rare on the Coastal Plain.

43. **Setaria** Beauv.

a. Bristles 5 or more, tawny; spikelets 3 mm. long. — 1. *S. lutescens*
a. Bristles 1–3, green or purple.
  b. Spikelets 2 mm. long. — 2. *S. viridis*
  b. Spikelets 3 mm. long. — 3. *S. italica*

1. **S. lutescens** (Weigel) Hub. (See Rhodora **18**: 232. 1916. *S. glauca* of authors.) GOLDEN FOXTAIL.

A weed of cultivated fields, roadsides, and waste places, in rich soil; common. July–Sept.

Nearly throughout N. A. Naturalized from Eu.

2. **S. VIRIDIS** (L.) Beauv. GREEN FOXTAIL. BOTTLE GRASS.

In situations similar to the preceding; common. July–Sept.
Nearly throughout N. A. Naturalized from Eu.

3. **S. ITALICA** (L.) Beauv. GERMAN OR HUNGARIAN MILLET.

Fields and waste places; an occasional escape from cultivation. July–Aug.
Native of Eu.

Two forms occur: one with green panicles (subsp. *stramineofructa* Hub.), and the other with purple panicles (subsp. *stramineofructa*, var. *Hostii*, subvar. *Metzgeri* (Körn.) Hub.) (See Amer. Journ. Bot. **4**: 169. 1915.)

44. **Cenchrus** L.

1. **C. PAUCIFLORUS** Benth. (See Contr. U. S. Nat. Herb. 22':67. 1920. *C. carolinianus* of Gray's Man., ed. 7, in part.) SANDBUR.

Dry sandy open soil; rare. July–Aug.
Roadside e. of Pout Pond (*A. J. E., K. M. W., & L. F. Randolph*, 1919), still persisting in 1922. Locally introduced.
Mass. to Oreg., southw. to Fla. and Calif. Found also in W. I., Mex., and S. A.

Tribe 10. *Andropogoneae*

45. **Andropogon** (Royen) L.

a. Raceme solitary; joints of the rhachis clavate.	1. *A. scoparius*
a. Racemes in fascicles; joints of the rhachis not clavate.	2. *A. furcatus*

1. **A. scoparius** Michx. BEARD GRASS.

Dry fields, roadsides, and thickets, in sandy noncalcareous soils; frequent or locally abundant. Aug.–Sept.

On the hills s. of Ithaca, on the sandy knolls about the ravine crests, along Cayuga Lake in similar places, and in the sandy regions n. of the lake; absent in the McLean region and on the clays and richer soils of the basin.

N. B. to Sask., southw. to Fla., Tex., and N. Mex.; common on the Coastal Plain.

2. **A. furcatus** Muhl. (*A. provincialis* of Cayuga Fl.) BEARD GRASS.

Dry banks, in slightly heavier gravelly noncalcareous soils; frequent. Aug.–Sept.
Six Mile Creek (*D.*); Cascadilla Creek (*D.*); Fall Creek, below Ithaca Falls (*D.*!); "especially abund. along the lake-shore" (*D.*); Big Gully; n. of Union Springs; Junius.
Me. to Sask., southw. to Fla., Tex., and N. Mex.; scarce on the Coastal Plain.

46. **Sorghastrum** Nash

1. **S. nutans** (L.) Nash. (*Chrysopogon nutans* of Cayuga Fl.)

Dry fields, roadsides, and banks, in sandy or gravelly soils; infrequent. Aug.–Sept.
Hillside n. of Buttermilk Glen; Six Mile Creek (*D.*); Fall Creek, near Triphammer Falls (*D.*); "lake shore and elsewhere" (*D.*); Big Gully; Utt Point; n. of Union Springs; Cayuga.
Me. to Man., southw. to Fla. and Mex., including the Atlantic Coastal Plain.
In the Cayuga Lake Basin the plant grows in sandy, rather neutral, soils, but it is found in pure marl in Bergen Swamp, Genesee Co., N. Y.

19. CYPERACEAE (SEDGE FAMILY)[6]

a. Spikelets umbellate, in umbellate clusters, or solitary.
b. Scales of the spikelet 2-ranked; perianth bristles none. 1. CYPERUS
b. Scales of the spikelet in several ranks, spirally arranged.
c. Base of style bulbous, persistent as a tubercle, jointed with the achene or at least differing abruptly in texture.
d. Perianth bristles present; spikelet solitary. 3. ELEOCHARIS
d. Perianth bristles wanting; spikelets umbellate. 4. STENOPHYLLUS
c. *Base of style not as above; spikelets umbellate or solitary.*
d. Base of style bulbous, deciduous; bristles none; plant low, with irregularly subumbellate spikelets. 5. FIMBRISTYLIS
d. Base of style not forming a distinct tubercle which is articulated with the achene, persistent; plant various.
e. Perianth bristles 0–8, exserted or included in fruit. 6. SCIRPUS
e. Perianth bristles many, much exserted in fruit. 7. ERIOPHORUM
a. Spikelets or spikes arranged in spikes or racemes or in racemose clusters, or rarely in a single terminal irregular cluster, rarely solitary but when so the achene inclosed in a sac.
b. Scales of the spikelet 2-ranked. 2. DULICHIUM
b. Scales of the spikelet or spike several-ranked, spirally arranged.
c. Achenes naked.
d. Achenes not conspicuously bony or ivory-like, not raised on a disk; fertile flowers perfect.
e. Style 2-cleft; perianth bristles usually present; achene with a beak-like tubercle. 8. RYNCHOSPORA
e. Style 3-cleft; perianth bristles wanting; achene without a tubercle. 9. MARISCUS
d. *Achenes bony or ivory-like, often raised on a disk; flowers monoecious.* 10. SCLERIA
c. Achenes inclosed in a sac (perigynium), which is often inflated; flowers monoecious or rarely dioecious. 11. CAREX

1. Cyperus (Tourn.) L.

a. Spikelets 1.5–3 mm. in diam., flat; style 2-cleft; achenes lenticular.
b. Scales membranous, dull; style branches exserted 2.3–4 mm.; stamens 2. 1. *C. diandrus*
b. Scales subcoriaceous, lustrous; style branches exserted 1.5 mm.; stamens 3. 2. *C. rivularis*
a. Spikelets not more than 1.4 mm. in diam.; style 3-cleft; achenes triangular.
b. Scales with recurved tips; plants annual. 3. *C. aristatus*
b. Scales with straight tips.
c. Spikelets in distinct umbellate spikes, stramineous or castaneous.
d. Scales 3.2–4 mm. long, strongly overlapping and appressed, stramineous; axis narrowly winged; achenes linear-oblong, acute; culms with perennial bulbous bases.
e. Nearly all the spikelets 9–20 mm. long. 4. *C. strigosus*
e. Nearly all the spikelets 4–8 mm. long. 4a. *C. strigosus*, var. *compositus*
d. Scales 2–2.5 mm. long (see also 3d *d*).
e. Scales thin, brownish, strongly nerved, deciduous; spikelets somewhat flattened, acute or obtuse, not subulate-tipped; rhachis narrowly winged, not thickened; achenes oblong-obovoid, obtuse; plants perennial, with slender tuber-bearing rootstocks. 5. *C. esculentus*

[6] Dates under each species in this family refer to the fruiting period.

e. Scales thicker, more castaneous, less strongly nerved, persistent; spikelets subterete, subulate-tipped; plants annual.
f. Scales of the same side overlapping; rhachis broadly winged, inclosing the obovoid, obtuse or mucronate, achene. 6. *C. ferax*
f. Scales of the same side distant; rhachis thickened, narrowly winged; achene oblong, acute at both ends. 7. *C. Engelmanni*
d. Scales 1.5 mm. long, mucronate, castaneous, overlapping; rhachis with broad wings which become separated as scales; achenes broadly oval, obtuse; plants annual. 8. *C. erythrorhizos*
c. Spikelets in solitary or sparsely umbellate heads, green; plants wiry, cespitose, perennial. 9. *C. filiculmis*, var. *macilentus*

1. **C. diandrus** Torr. (*C. diandrus* of Cayuga Fl., in part.)

Sandy or mucky strands, also in meadows; scarce. Aug.–Sept.

Found only on the shores of Cayuga Lake and on the brackish marshes of the Ontario plain: Renwick; Canoga Marshes; salt flats e. of Montezuma.

N. B. to Minn., southw. to S. C. and Kans., including the Coastal Plain.

A plant primarily of brackish situations; more common in N. J. along the coastal strip, and occurring in central N. Y. only where other brackish-marsh plants are found.

2. **C. rivularis** Kunth. (*C. diandrus* of Cayuga Fl., at least in part.)

Damp sandy, gravelly, or marly strands and meadows, in more or less calcareous soils; not uncommon. Aug.–Sept.

Marl strand, Spencer Lake; Six Mile Creek; marl spring, Coy Glen; Renwick flats and shores; marl spring above Forest Home; Beaver Brook; Asbury; boggy field, Benson Corners; gravelly strand and marl pool, Salmon Creek; Big Gully Point; Hibiscus Point; canal n. of Cayuga; Duck Lake.

Me. to s. Ont. and Mich., southw. to N. C., Mo., and Kans.; common on the coastal plain of Mass. and N. J., a peculiar situation considering the distinctly calcareous distribution in the Cayuga Lake Basin.

3. **C. aristatus** Rottb. (*C. inflexus* of Cayuga Fl.)

Sandy, gravelly, or muddy shores; rare. Aug.

Bar in Eddy Pond (Cascadilla Glen), 1884 (*D.*); shore of Cayuga Lake, Renwick, 1894 (*W. W. Rowlee & K. M. W.*); gravelly shore by lighthouse, Ithaca; Myers Point; lake shore opposite Cayuga village.

N. B. to B. C., southw. to Fla., Tex., Calif., and Mex.; apparently rare on the Atlantic Coastal Plain.

The factors influencing the distribution of this species are not apparent. The localities are more or less calcareous and two are somewhat saline. However, the plant grows in the acid sands of eastern Mass. (though not in those of N. J.), while along the coast it is distinctly not a plant of brackish marshes.

4. **C. strigosus** L.

Low open grounds, in sand or gravel, often with an admixture of clay or alluvium, with little reference to the lime content of the soil; common. Aug.–Sept.

Me. to Ont. and Minn., southw. to Fla. and Tex., including the Coastal Plain.

4a. **C. strigosus** L., var. **compositus** Britton.

Usually in springy places on hillsides; frequent.

Near top of hill road n. of Coy Glen; Cayuga Heights, in several places; near Indian Spring; "a form is not uncommon on the brackish soil near the 'Deer-lick' west side of Cayuga marshes, bearing 5-flowered spikelets in narrow oblong rays" (*D.*), probably this variety.

Mass. to Fla., La., and Iowa.

5. **C. esculentus** L. (*C. phymatodes* of Cayuga Fl.) YELLOW NUT GRASS.

Low rich open sandy cultivated fields, shores, and waste places, preferring sand, but relation to lime unknown; infrequent. Aug.

Near Cayuta Lake; South Hill (*D.*); Linn St., Ithaca (*D.*); flats of Fall Creek s. w. of Forest Home; Renwick flats; "Cayuga L. on the damp sandy points" (*D.*); Salmon Creek; near Canoga Marshes.

N. B. to Minn. and Nebr., southw. to Fla. and Tex., including the Coastal Plain, and on the Pacific Coast from Calif. to Alaska. Found also in tropical Am. and the Old World.

The tubers are edible. This is a bad weed in sandy moist soils, especially in potato fields, where the rhizomes penetrate the potato tubers.

6. **C. ferax** Rich. (*C. speciosus* Vahl. *C. Michauxianus* of Cayuga Fl.)

Sandy shores, in the Cayuga Lake Basin in brackish and often limy situations; locally frequent. Aug.–Sept.

Only toward the foot of Cayuga Lake and on the Ontario plain: "Union Springs and Canoga to Cayuga, and on the borders of Cayuga marshes" (*D.*),; canal n. of Cayuga; Hibiscus Point; Seneca River, at Howland Island; salt flats, Montezuma.

Mass. to Minn., southw. to Fla. and Tex., including the Coastal Plain; also in Calif. and in tropical regions.

7. **C. Engelmanni** Steud.

Sandy shores, rare. Sept.

"On shore of Canoga marshes" (*D.*); a specimen from Union Springs in the C. U. Herb. has the non-overlapping scales of this species, but the spikelets are much longer and less pointed.

Mass. to Wis., southw. to N. J. and Mo.; rare or absent on the Coastal Plain.

8. **C. erythrorhizos** Muhl.

Sandy shores; rare. Aug.

A few plants were found in 1914 on the lake shore at Renwick; not seen in recent years.

Mass. to Minn., southw. to Fla., Tex., Kans., and Calif., including the Atlantic Coastal Plain.

9. **C. filiculmis** Vahl, var. **macilentus** Fernald.

Dry sandy hillsides and fields, in noncalcareous soils; also a weed on railroad embankments; local. July–Aug.

Fields around the Junius bogs and ponds, fairly abundant (*D.*!); L. V. R. R. track at Fall Creek, 1917–1918; East Ithaca station, 1919. Probably introduced at the two last-named stations.

Me. to Ont., southw. to Va., Ohio, and Ill., including the Coastal Plain.

2. Dulichium Pers.

1. **D. arundinaceum** (L.) Britton. (*D. spathaceum* of Cayuga Fl.)

Shallow water of marshes, in boggy neutral or acid soils; fairly common. Aug.

Summit Marsh; Cayuta Lake; Dryden Lake; Chicago Bog; Junius bogs; Duck Lake; and elsewhere.

Newf. to Wash., southw. to Fla. and Tex., including the Atlantic Coastal Plain.

3. Eleocharis R. Br.*

a. Spikelets 2–5 cm. long; scales very broad, pale, obtuse; culms tall, sharply 4-angled. 1. *E. quadrangulata*

a. Spikelets 1.8 cm. long or less; scales broad or narrow; culms, if tall, terete.

b. Achenes lenticular, smooth and glossy or slightly cellular; styles 2-cleft.

* Commonly called Spike Rush.

c. Upper sheath loose, with white scarious summit; plants low, perennial, with matted rootstocks; tubercle narrow, saucer-shaped, conical-beaked. 2. *E. olivacea*

c. Upper sheath close, not scarious, often dark-margined.

d. Plants tufted, annual; tubercle broad, depressed. 3. *E. obtusa*

d. Plants not tufted, perennial, with creeping rootstocks; tubercle narrow, ovate. 4. *E. palustris*

b. Achenes triangular or turgid, not smooth and glossy; styles 3-cleft.

c. Achenes coarsely reticulated, the transversely elongated areoles in several vertical rows; culms capillary, 3–10 cm. high; plants perennial, forming dense mats. 5. *E. acicularis*

c. Achenes minutely cellular-reticulated, the areoles nearly isodiametric.

d. Tubercle definitely articulated with the achene; culms not rooting at tip.

e. Tubercle depressed; culms wiry, 4-angled, erect; plants perennial, with creeping rootstocks. 6. *E. capitata*

e. Tubercle conical-subulate; culms striate-grooved, recurved; plants annual, tufted. 7. *E. intermedia*

d. Tubercle continuous with the achene, pyramidal; culms stout, recurved, rooting at tip (3–12 dm. long). 8. *E. rostellata*

1. **E. quadrangulata** (Michx.) R. & S. (See Rhodora **27**:37. 1925.)

In shallow water along the borders of ponds, perhaps influenced by saline conditions; rare. Aug.

Duck Lake (*K. M. W., A. J. E., & L. F. Randolph*). [Elsewhere reported from N. Y. State only from Westchester Co. (*Mead*), Lake Neahtowantah, Oswego Co. (*Coville, Rowlee, Sheldon*), Paddy Lake, Oswego Co. (*Wibbe*), and outlet of Oneida Lake (*A. H. Curtiss* in Gray's Man., ed 5).]

Mass. to Ont. and Mich., southw. to Ala. and Tex., including the Coastal Plain; also in warmer parts of Am.

2. **E. olivacea** Torr.

Wet peaty and mucky acid soil, in sandy or gravelly regions; rare. Aug.

Summit Marsh; Pout Pond marsh; Slayton Pond.

N. S. to Ont. and Mich., southw. to Pa., S. C., and Ohio, including the Coastal Plain.

3. **E. obtusa** (Willd.) Schultes.

Shores, ditches, and exsiccated places, in a great variety of soils; common, and generally distributed. June–Aug.

N. S. to Ont., southw. to Fla. and Tex., including the Coastal Plain; also from B. C. to Oreg.

E. ovata (Roth) R. & S. has not been found here, hut Dudley's no. 1019 strongly suggests this.

4. **E. palustris** (L.) R. & S.

Form *a*.—Very slender; culms 0.3–1 mm. thick.

Sandy or silty shores and crevices of rocks in ravines, probably in limy soils; frequent. June 20–Aug.

Enfield Glen; Dwyer Pond; lake shore at Renwick; near Townley Swamp; near Asbury; lake shore at Utt Point and Big Gully Point; marl ponds at Hibiscus Point; Slayton Pond.

Form *b*.— Culms 1–2.5 mm. thick.

Marly brook, e. end of Dryden Lake; deep water, n. end of Chicago Bog.

Form *c*.— Culms 2.8–3.3 mm. thick, almost or quite as broad as the spikelet; plants very tall.

Shallow water, Summit Marsh.

5. **E. acicularis** (L.) R. & S.

Ditches, meadows, and muddy shores, often in sand, showing little relation to lime content of the soil; common. June–Oct.

Newf. to B. C., southw. to N. J., Mo., Mex., and Calif., including the Atlantic Coastal Plain. Found also in Eurasia and W. I.

6. **E. capitata** (L.) R. Br. (See Rhodora **20**: 23. 1918. *E. tenuis* of Gray's Man., ed. 7, and of Cayuga Fl.)

Springy and marly shores and meadows, in acid, neutral, or strongly alkaline soils; frequent. May 10–July 15.

Pasture, South Hill; marl springs s. and n. of Coy Glen; marl spots w. of Key Hill; moor of Junius marl ponds; and elsewhere.

Newf. to Man., southw. to Fla. and Tex., including the Coastal Plain.

The preference of this plant for marl in this flora is difficult to correlate with its distribution in acid soils on the Coastal Plain and in N. E.

7. **E. intermedia** (Muhl.) Schultes.

Sandy or gravelly shores or springy places, in more or less calcareous soils; frequent. July–Aug.

Spencer Lake; swamp w. of Key Hill; Larch Meadow; Six Mile Creek; Fall Creek, at Beebe Lake and above Forest Home; lake shore, Renwick (*D.*!); spring s. of Dryden Lake; gravelly shore, Myers Point; gravelly strand, Salmon Creek; muddy brook, Malloryville Bog; ditch, Beaver Brook; McLean Bogs; Cortland marl ponds; Lake Como (Locke Pond, *F. L. Kilborne*); Big Gully Point; Junius marl ponds.

Que. to w. Ont., southw. to n. N. J., Pa., Ohio, and Iowa; rare or absent in the granitic acid parts of N. E.

8. **E. rostellata** Torr.

Brackish and marly marshes; rare. June 15–July.

In this basin confined to the Ontario plain: about Indian Salt Spring (*D.*); Junius marl ponds (*D.*!); Miller Bog, Spring Lake.

Salt marshes from N. S. to Fla. and Tex., and on the Pacific coast; also locally in alkaline situations inland. Found also in Mex. and Cuba.

4. **Stenophyllus** Raf.

*1. **S.** CAPILLARIS (L.) Britton.*

Found in 1913 in considerable quantity on the cinders and gravel in the L. V. R. R. yards n. of the station, Ithaca, and at the same place again in 1919. Locally introduced.

Sandy regions: Me. to Minn. and Calif., southw. to Fla., Tex., and tropical Am.

5. **Fimbristylis** Vahl

1. **F. autumnalis** (L.) R. & S. (See Rhodora **20**: 24. 1918. *F. Frankii* of authors.)

Sandy strands; rare. Aug.–Oct.

Farley Point, 1895 (*W. W. Rowlee & K. M. W.*); not seen since.

Me. to Ont., southw. to Tenn. and La., including the Coastal Plain.

6. **Scirpus** (Tourn.) L.

a. Involucre none, or merely the modified outer scale of the solitary terminal spikelet; culms not plainly leafy.

b. Perianth bristles not exceeding the scales, terete.

c. Bristles retrorsely barbed; spikelets flattened; achenes beaked; scales without definite midribs, membranous, pointless.

d. Achenes 1 mm. long; plants low, annual; culms filiform, 1–5 cm. high.
1. *S. nanus*

d. Achenes 2–2.5 mm. long; plants taller, perennial, with slender rootstocks; culms 0.5–1.5 mm. thick, 5–30 cm. high. 2. *S. pauciflorus*

c. Bristles upwardly setulose; spikelets terete; achenes beakless; scales with firm green midribs, apiculate. 3. *S. planifolius*

b. Perianth bristles in fruit much exceeding the scales (2–3 cm. long), not barbed, flattened. 4. *S. hudsonianus*

a. Involucre consisting of a firm green erect bract, appearing to be a continuation of the culm; culms not leafy (see also 3d *a*).

b. Spikelets solitary or in a sessile cluster.

c. Culms low, subterete, spreading; bristles usually wanting. 5. *S. Smithii*

c. Culms taller and more erect, sharply 3-angled; bristles present.
6. *S. americanus*

b. Spikelets umbellate or panicled.

c. Achenes 2 mm. long; scales 2–2.5 mm. long, subglabrous, scarcely spotted, midrib conspicuous and greenish; inflorescence lax; spikelets ovoid to subcylindrical; culms usually soft. 7. *S. validus*

c. Achenes 2.5 mm. long; scales 3–4 mm. long, more or less viscid-puberulent on back and much spotted, midrib less evident and more concolorous; inflorescence usually condensed; spikelets clustered, generally cylindrical; culms usually firm and hard. 8. *S. acutus*

a. Involucre consisting of 2–many leafy bracts; spikelets capitate or in a compound umbel; culms leafy.

b. Spikelets large, 10–50 mm. long, 5–10 mm. wide; culms sharply 3-angled, springing from strong, often tuberous, creeping rootstocks.

c. Achenes sharply and equally 3-angled; plants stout, 1–2.5 m. high; leaves 0.7–2 cm. wide. 9. *S. fluviatilis*

c. Achenes lenticular or obscurely and bluntly 3-angled; plants 0.3–1 m. high; leaves stiff, 3–9 mm. wide. 10. *S. campestris*, var. *paludosus*

b. Spikelets small, 2–15 mm. long, 1–3 mm. wide, more numerous; culms obtusely 3-angled or terete.

c. Bristles retrorsely barbed; culms solitary or loosely clustered; plant with thick scaly stolons; spikelets in glomerules.

d. Lower sheaths red-banded; bristles barbed nearly to the base.
11. *S. rubrotinctus*

d. Lower sheaths green; bristles barbed only above the middle.

e. Bristles scarcely longer than the achene, usually shorter; spikelets dark brown or dark lead-color.

f. Blades 10–18 mm. wide; lower sheaths cellular-nodulose; bristles about equaling the achene. 12. *S. atrovirens*

f. Blades 4–10 mm. wide; lower sheaths not nodulose; bristles shorter than or as long as the achene, sometimes wanting; plant more slender.
12a. *S. atrovirens*, var. *georgianus*

e. Bristles twice the length of the achene; spikelets rufous-brown.
13. *S. polyphyllus*

c. Bristles smooth or sparingly upwardly setulose, curly; plant densely or loosely cespitose, not stoloniferous; spikelets in glomerules or separate.

d. Bristles not exceeding the scales; spikelets separate, elliptic-oblong, 5–10 mm. long. 14. *S. lineatus*

d. Bristles much exserted at maturity; spikelets 3–9 mm. long.

e. Fruit late (shedding achenes Aug. (10) 15–Oct. 17); spikelets subglobose to elliptic-oval or oblong, all sessile and glomerulate or some pedicelled.

f. Glomerules dense; spikelets subglobose or oval, rather small (3–4 mm. long); bristles very crisp; involucels and scales brown or brownish lead-color, rarely more rufous; plant stout or rather slender (9–15 dm. high); leaves 5–8 mm. wide; culms at summit 1.8–5 mm. in diam. 15. *S. cyperinus*

f. Glomerules looser, some spikelets often pedicelled; spikelets ellipsoid-oval or oval, 4–5 mm. long; bristles more lax.

g. Plant stout (12–17 dm. high); leaves 5–7 mm. wide; culms at summit 2–2.5 mm. in diam.; involucels and scales lead color, brown, or rarely rusty. 15a. *S. c.*, var. ——

g. Plant slender (8–13 dm. high); leaves 3–5 mm. wide; culms at summit 1.1–1.5 (1.8) mm. in diam.; involucels and scales brown or brownish lead-color. 15b. *S. c.*, var. *pelius*

e. Fruit early (shedding achenes June 25–Aug. 7, rarely Aug. 18); spikelets elliptic-oval or oblong, nearly all pedicelled.

f. Plant stout (12–15 dm. high); leaves 5–8 mm. wide; culms at summit 1.8–4 mm. in diam.; involucels and scales brown; spikelets 3–9 mm. long. 16. *S. pedicellatus*

f. Plant slender (6–11 dm. high); leaves 3–5 mm. wide; culms at summit 1–1.8 (2) mm. in diam.; involucels and scales dark lead-color, rarely brown; spikelets 3–7 mm. long. 17. *S. atrocinctus*

1. **S. nanus** Spreng.

Muddy shores in brackish soils; very rare. Aug.–Sept.

Salt Pond w. of Howland Island, 1919 (*K. M. W., A. J. E., & L. F. Randolph*).

Salt and brackish marshes along the coast, Newf. to Fla. and Tex. Found also inland in N. Y. and Mich., and in Mex., Cuba, Eu., and n. Africa.

2. **S. pauciflorus** Lightf. (*Eleocharis pauciflorus* of Cayuga Fl.)

Wet sandy swales and shores, in calcareous soils; rare. July–Sept.

Gravelly shore of Spencer Lake; Summit Marsh, n. end (*D.*!); Utt Point (*D.*!); Farley Point (*D.*).

Newf. to B. C., southw. to n. N. E., N. Y., Pa., Ill., Colo., and Calif.; rare or absent on the Atlantic Coastal Plain.

3. **S. planifolius** Muhl.

In and about dry open woodlands, in gravelly or rocky, neutral or slightly acid, soils; scarce. May–June.

South Hill, beyond the "Incline" (*D.*); Fall Creek (*D.*); Renwick slope (*D.*!); near Esty Glen; absent on the more acid chestnut soils of the basin, also on the limy soils and the heavy clays.

Mass. and Vt. to w. N. Y. and Mo., southw. to D. C., including the Coastal Plain.

4. **S. hudsonianus** (Michx.) Fernald. (*Eriophorum alpinum* of Cayuga Fl.)

Boggy and somewhat limy meadows and swamps; rare. May 25–July 15.

McLean Bogs (*D.*!); Westbury Bog (*K. M. W., L. H. MacDaniels, & F. P. Metcalf*).

Newf. to Hudson Bay and B. C., southw. to Conn., N. Y., and Minn.

5. **S. Smithii** Gray.

Sandy shores; rare. Aug.–Sept.

Renwick Park (*K. M. W. & C. C. Thomas*); Myers Point (*D.*); Utt Point; Farley Point (*D.*); mouth of Big Gully Brook (*D.*!).

Me. and Ont. to Minn., southw. to Pa. and Nebr., including the Coastal Plain.

Possibly influenced in its local occurrence by the well-known brackish conditions about Cayuga Lake.

6. **S. americanus** Pers. (*S. pungens* of Cayuga Fl.)

Sandy shores and marshes; frequent. June 20–Sept.

Cayuta Lake; Lake Como (Locke Pond, *D.*); many places on the Ithaca flats and along the shores of Cayuga Lake; Montezuma Marshes; Miller Bog, Spring Lake.

Nearly throughout temperate N. A., including the Atlantic Coastal Plain. Found also in S. A. and in Eu.

Possibly influenced in its local occurrence by the brackish nature of the lake marshes.

7. **S. validus** Vahl. (*S. lacustris*, in part, of Cayuga Fl.) BULRUSH.

Marshes and lakes, in gravelly, silty, or muddy soils with little apparent relation to lime content; common. June 15–Aug. 10.

Cayuta Lake; pond at Mecklenburg; Dryden Lake; Six Mile Creek; Fall Creek, above Forest Home; Townley Swamp; shores of Cayuga Lake, in many places; Montezuma Marshes.

Throughout temperate N. A., including the Coastal Plain. Found also in W. I.

Specimens from the southwest corner of Cayuga Lake, and in gravel in Six Mile Creek, are slender, with firm culms, as in the next species.

8. **S. acutus** Muhl. (See Rhodora 22: 55. 1920. *S. occidentalis* (Wats.) Chase.) BULRUSH.

Sandy, gravelly, or muddy shores, in brackish or calcareous regions; frequent. June 25–Aug.

Confined chiefly to Cayuga Lake, the adjacent marshes, and the Ontario plain: Spencer Lake; s. w. corner of Cayuga Lake; near Union Springs; Canoga Marshes; Junius marl ponds.

Newf. to B. C., southw. to Mass., cent. N. Y., Mo., Ariz., and Calif.; frequent along the coast.

[*S. heterochaetus* Chase has been found at Watkins, N. Y.]

9. **S. fluviatilis** (Torr.) Gray.

Marshes; locally common. June 20–Aug.

Summit Marsh (*D.*); Inlet Marshes; Cayuga Marshes, very common.

N. B. to D. C., and locally through the Great Lakes region to Minn., Nebr., and Kans.; in the east, chiefly near the coast.

Probably influenced in its local occurrence by brackish conditions.

10. **S. campestris** Britton, var. **paludosus** (Nels.) Fernald. (*S. maritimus* of Cayuga Fl.)

Low sandy alluvial soil in the vicinity of salt springs; rare. July–Aug.

Salt springs on lake shore n. of Cayuga Lake Park; Salt Pond w. of Howland Island; brackish meadow e. of Montezuma village; Montezuma Marshes near Salt Creek (*D.*).

Gulf of St. Lawrence to N. J. along the coast, and inland from cent. N. Y. along the Great Lakes to Minn., Oreg., Kans., Nev., and Mex.

11. **S. rubrotinctus** Fernald. (*S. sylvaticus*, var. *digynus*, of Cayuga Fl.)

Marshy, mucky, frequently alluvial places in fields and near the larger marshes, mostly in neutral or nearly neutral rich soils; scarce. June–July.

Inlet, near Ithaca-Newfield town line, near Lick Brook, and s. of Ithaca; swale on South Hill; "marsh south of the boat-landing and north of Ithaca" (*D.*); near Wood Mill station (*D.*); Cayuga Marshes (*D.*).

Lab. to Alberta, southw. to Conn., N. Y., the Great Lakes, Minn., Nev., and Calif., including the Atlantic Coastal Plain.

A comparison of eastern and western specimens seems to indicate that at present it is unwise to unite *S. rubrotinctus* and *S. microcarpus* Presl.

12. **S. atrovirens** Muhl.

Ditches, meadows, and marshes, in heavy or light soil, often but not always in the presence of lime; common. July.

Me. to Sask., southw. to Ga. and Mo., including the Coastal Plain.

12a. **S. atrovirens** Muhl., var. **georgianus** (Harper) Fernald. (See Rhodora **23**: 134. 1921. *S. georgianus* Harper.)

Low fields, meadows, and marshes, in somewhat drier and less mucky situations; very common. July.

Newf. to Mich., southw. to Ga. and Ark., probably including the Coastal Plain.

After a thorough study of a large amount of material, both local and general, it seems impossible to support *S. georgianus* as a species. The form appears to be simply a small extreme of *S. atrovirens* — smaller in stature, breadth of leaf, size of inflorescence, glomerules, spikelets, and scales — and a continuous series bridges over the gap between these extremes. The larger forms always have the more nodulose sheaths, and bristles equaling the achene; while the smaller forms have nearly smooth sheaths, and bristles usually shorter than the achene or wanting, though in some cases the bristles may be as long as the achene. The shape of the achene varies in both forms through the same range of outline. The coarser forms inhabit richer and wetter soils, and this may be an important factor in creating the morphological differences.

13. **S. polyphyllus** Vahl.

Springy meadows, apparently in limy soils; rare. July–Aug.

White Church valley (*D.*); springy pasture n. w. of Caroline Center (*K. M. W.*, *A. J. E.*, *& L. F. Randolph*); w. side of Ball Hill, Danby; Larch Meadow (*D.!*); springy hillside e. of Cayutaville.

W. N. E. to Minn., southw. to Ga. and Ark., but probably not on the Coastal Plain.

14. **S. lineatus** Michx.

Damp or wet sandy, or sandy and clayey, usually somewhat calcareous, soils; frequent. June 20–July.

N. e. and n. w. of Freeville, abundant, often completely occupying the fields; lower Mud Creek, Freeville; n. of McLean Bogs; Cayutaville; clay field s. of Waterburg; n. of Jacksonville (*D.*); Taughannock, above and below the falls and on the point (*D.!*); Paine Creek (*D.!*); Utt Point; "Genoa, by R. R." (*D.*); Big Gully and Big Gully Point; marly moor of Vandemark Pond; Montezuma; s. of Duck Lake.

Ont. and N. H. to Ga., also Kans., Tex., and Oreg.; scarce on the Atlantic Coastal Plain.

15. **S. cyperinus** (L.) Kunth. WOOL GRASS.

Low grounds; common. Aug. (10) 15–Oct. 17.

Range, as the species is here interpreted, not determined.

Knowledge of this group of the genus Scirpus is in a very unsatisfactory condition. The treatments in Gray's *Manual* and in Britton and Brown's *Illustrated Flora* do not satisfactorily account for the local forms. The treatment here proposed is temporary and is based chiefly on local and New York State material. The color of the inflorescence does not seem to be of fundamental importance. Dudley's *S. Eriophorum* and var. *cyperinus* apparently included this species and the following two varieties.

15a. **S. cyperinus** (L.) Kunth, var. —.

Boggy soil; occasional or frequent.

Fleming Meadow (involucels reddish); Ringwood; Mud Creek, Freeville; McLean Bogs; near Benson Corners; s. w. of Spring Lake (involucels reddish).

N. Y., N. J., and elsewhere; range not definitely known.

15b. **S. cyperinus** (L.) Kunth, var. **pelius** Fernald.

Boggy soils; common.

N. Y., N. J., and elsewhere.

16. **S. pedicellatus** Fernald. (*S. Eriophorum*, var. *laxus*, of Cayuga Fl.) WOOL GRASS.

Alluvial marshes; less frequent than the last-named form. July 20–Aug. 10.

Summit Marsh and Spencer Lake; Jennings Pond; Cayuta Lake; South Hill; n. of Freeville; Chicago Bog; common on the Inlet and Outlet Marshes.

E. Que. to Conn., N. Y., and Wis., mostly in the interior.

Plants with condensed inflorescences occur occasionally.

17. **S. atrocinctus** Fernald.

Boggy meadows and peat bogs, in acid soil; scarce. June 20–July.

High hills n. e. of Slaterville and n. e. of Caroline village; Ringwood; n. and n. w. of Freeville; near Mud Creek, Freeville; near Grotto.

Newf. to Hudson Bay and Sask., southw. to Conn., Pa., Mich., and Iowa.

A northern plant, especially of granitic regions, not distinctly coastal.

7. **Eriophorum** L.

a. Spikelet solitary, terminal; leafy involucre none; leaves narrow, basal.
1. *E. callitrix*

a. Spikelets 2–several, capitate or umbellate, surrounded by a leafy involucre.

b. Involucral bract 1, short; leaves 1–2 mm. wide, channeled; achene ellipsoidal.
2. *E. gracile*

b. Involucral bracts several; leaves 1.5–6 mm. wide, flat.

c. Spikelets loosely umbellate; scales lead color, not striate, with a strong midrib; wool white; leaves 2–6 mm. wide, lax; achenes obovoid.
3. *E. viridi-carinatum*

c. Spikelets densely capitate; scales greenish straw-color, striate; wool tawny or white; leaves 1.5–4 mm. wide, stiffer; achenes linear-oblong.
4. *E. virginicum*

1. **E. callitrix** Cham. (*E. vaginatum* of Cayuga Fl.) HARE'S TAIL. COTTON GRASS. WOOL GRASS.

Peat bogs over acid or somewhat calcareous soil; scarce. May 20–June 20.

Larch Meadow (*D.*); McLean Bogs (D.!); Junius bogs; Duck Lake; Westbury Bog.

Lab. to Alaska, southw. to Pa., Mich., Wis., and Man. Found also in Asia.

2. **E. gracile** Roth. COTTON GRASS. WOOL GRASS.

Acid peat bogs, also in calcareous springy places; scarce. June 10–July 20.

Michigan Hollow Swamp; Freeville (*D.*); Mud Creek, Freeville; one mile n. of McLean; McLean Bogs; Chicago Bog (*D.*!); "Venice, near R. R." (*D.*); Junius peat bogs.

Newf. to B. C., southw. to Conn., Pa., Mich., Nebr., and Calif.; occasional on the Atlantic Coastal Plain. Found also in Eurasia.

The achenes are often 3 mm. long instead of 1.5–2 mm. long, as frequently stated, and the wool is occasionally tawny. The closely related *E. tenellum* Nutt. should be found in the basin, as it occurs in the adjoining counties toward the east and northeast. A specimen from Junius, 1885 (*D.*), seems to be *E. tenellum* in all characters except the scales, which are greenish. The achenes were not seen.

3. **E. viridi-carinatum** (Engelm.) Fernald. (*E. polystachyon* of Cayuga Fl.) COTTON GRASS. WOOL GRASS.

Bogs and meadows, mostly in calcareous soils; frequent. May 20–July 15.

W. of Key Hill; Larch Meadow; Fir Tree Swamp between Slaterville and Dryden; *Freeville; Mud Creek, Freeville; Malloryville; McLean Bogs; n. of McLean;* Beaver Brook; Turtle Pond; Miller Bog, Spring Lake; Westbury Bog.

Newf. to Sask. and B. C., southw. to Conn., N. Y., Ohio, Mich., Wis., Oreg., and in the mts. to Ga., including the northern Atlantic Coastal Plain.

4. **E. virginicum** L. COTTON GRASS. WOOL GRASS.

Acid soil of peat bogs; frequent. Aug.–Sept.

Freeville Bog (*D.*); Woodwardia Bog (*D.*!); Malloryville Bog (*D.*!); McLean Bogs (*D.*!); Junius peat bogs (*D.*!); bog n. of Duck Lake; Featherbed Bog.

Newf. to Ont. and Man., southw. to Fla. and Nebr.; common on the Coastal Plain.

Plants with white wool (forma *album* (Gray) Wiegand, see Rhodora **26**: *2, 1924, E. v.,* var. *album* Gray) occur occasionally.

8. Rynchospora Vahl

a. Spikelets white or tawny-white, the upper ones densely clustered; fertile flower 1; stamens 2; bristles 9–12 or more. 1. *R. alba*

a. Spikelets castaneous, 3–6 *together; fertile flowers several; stamens 3; bristles 6* (rarely 12). 2. *R. capillacea*

1. **R. alba** (L.) Vahl. BEAK RUSH.

Boggy soil, either in acid peat bogs or in marl; frequent. July–Sept. 15.

Summit Marsh; marly place w. of Key Hill; Larch Meadow; Freeville Bog; McLean Bogs; Junius, in the peat bogs and also on the marl moor; Miller Bog, Spring Lake; Featherbed Bog.

Newf. to Alaska, southw. to Fla., Ky., the Great Lakes, Idaho, and n. Calif., including the Atlantic Coastal Plain. Found also in Eurasia.

2. **R. capillacea** Torr. BEAK RUSH.

Marl meadows; rare. July–Aug.

"Junius" (*Sartwell*); Junius marl ponds (*D.*!).

E. Que. to w. Ont., southw. to n. N. J., Pa., Ohio, Mich., and Mo.; rare or absent on the Coastal Plain.

9. Mariscus (Hal.) *Zinn.*

1. **M. mariscoides** (Muhl.) Kuntze. (See Rhodora **25**: 49. 1923. *Cladium mariscoides* (Muhl.) Torr.)

Shallow water about the sandy and often boggy calcareous shores of ponds; rare. July 20–Sept.

Summit Marsh (*D.*!); Chicago Bog (*D.*); moor of Junius marl ponds (*D.*!); prairie s. of Westbury Bog; Miller Bog, Spring Lake; Slayton Pond.

N. S. to Ont. and Minn., southw. to Fla., Ky., Ind., and Iowa; especially frequent on *the* Coastal Plain.

The influencing factors in the distribution of this species are not clear. Though in this flora, except for the Chicago Bog station, the species is distinctly a marl plant, in eastern Mass. it apparently inhabits acid ponds, and in N. J. it is characteristic of the pine barrens but not of the chestnut middle-belt nor of the coastal strip. It is probably dependent on the presence of various salts.

10. **Scleria** Berg.

a. Disk obsolete; scales 2–3 mm. long; flowers in several distinct spicate clusters; plant nearly or quite glabrous. 1. *S. verticillata*
a. Disk bearing 6 tubercles; scales 4–5 mm. long; flowers irregularly aggregated in a single cluster; plant very pubescent. 2. *S. pauciflora,* var. *caroliniana*

1. **S. verticillata** Muhl.

Marl meadows; rare. Aug.
"Junius" (*Sartwell*); Lowery and Newton Ponds (*D.*!).
Mass. to Ont. and Minn., southw. to Fla., Tex., and Mex., especially along the coast. Found also in W. I.

2. **S. pauciflora** Muhl., var. **caroliniana** (Willd.) Wood.

Moor of marl bogs; very rare. July 15–Aug. 15.
Collected in 1893 on the moor of Lowery Ponds (*K. M. W.*) but not seen since, reported in Bul. Torr. Bot. Club 21:176, 1894. Elsewhere in N. Y. State, reported only from the vicinity of New York and from "wet meadows, hillsides," Greece, Monroe Co. (*Bradley*).
Mass. to Ga. along the coast, cent. N. Y., and Ohio.

11. **Carex** (Rupp.) L.

a. Spike solitary, terminal. PAGE
b. Scales not foliaceous; beak not abrupt. (Primocarex.)
c. Perigynia elliptic, obtuse, erect; plant cespitose............1. *C. leptalea* 115
c. Perigynia subulate, acute, reflexed, easily and elastically deciduous; plant stoloniferous..................................2. *C. pauciflora* 115
b. Scales, at least the lower ones, foliaceous; beak abrupt, slender.
c. Bodies of the perigynia elliptic-oblong; pistillate flowers 3–9; lowest scale 0.5–1.5 cm. long; staminate scales 2–2.3 mm. long, pale, with a green midrib; staminate spike 0.7–0.9 mm. in diam............64. *C. Willdenowii* 125
c. Bodies of the perigynia subglobose; pistillate flowers 2–3; lowest scale 1.5–5 cm. long; staminate scales 1.6–1.8 mm. long, with a dark transverse band near the tip; staminate spike 0.4–0.5 mm. in diam....65. *C. Jamesii* 125
a. Spikes several.
b. Spikes normally bisexual and similar, all containing staminate and pistillate flowers in about the same relative proportions; stigmas 2; perigynia plano-convex, rarely terete. (Vigna.) (2d *b*, p. 108.)
c. Spikes staminate at apex. (Acroarrhenae.) (2d *c*, p. 105.)
d. Perigynia few, very plump, almost terete, nearly or quite beakless; spikes scattered; plants low and very slender.................24. *C. tenella* 118
d. Perigynia convex on both surfaces, plano-convex, or flat, usually two-edged and acute or beaked.
e. Plants cespitose or with short creeping rhizomes. (2d *e*, p. 105.)
f. Perigynia subulate-lanceolate, 4–7 mm. long, spongy-thickened at base, strongly nerved; spikes aggregated; culms broad, soft, wing-angled; leaves 4–15 mm. wide.
g. Perigynia 4 mm. long; hyaline part of leaf sheath usually transversely rugose..................................3. *C. stipata* 115
g. Perigynia 5–7 mm. long; hyaline part of sheath rarely rugose, thickened at orifice........................4. *C. laevivaginata* 115
f. Perigynia elliptic-lanceolate to oval or ovoid (6 mm. long or less), nearly nerveless except in no. 10; spikes, culms, and leaves various.
g. Spikes or branches of the inflorescence 10 (12) or less. (2d *g*, p. 105.)

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h. Perigynia 4.2–6 mm. long; scales more or less fuscous; leaves 2–3 mm. wide..............................5. *C. contigua* 115

h. Perigynia 3.8 mm. long or less; scales green, stramineous, tawny, or whitish.

i. Leaves 1–4.5 mm. wide; sheaths close.

j. Perigynia spongy-thickened at base, and in that region puckered when dry; inflorescence more or less interrupted, or spikes scattered.

k. Beak smooth, scarcely exceeding the tawny, acute scale. 6. *C. retroflexa* 115

k. Beak scabrous, much exceeding the silvery white, rarely tawny, obtuse or subacute scale.

l. Broadest leaves (1.8) 2–3 mm. wide; sheaths at base of culm 1.5–2 mm. in diam.; perigynia broadly elliptic-ovoid, 3–4.2 mm. long (perigynia deep green, in the lower spikes 9–12 rarely 6–20 in number; the wall thin, the beak prominent, thin, plainly bidentate, strongly serrulate; stigmas stout, short, curved; scales pale, obtuse; fruit May 25–June 20)..7. *C. convoluta* 115

l. Broadest leaves 0.8–1.8 (2) mm. wide; sheaths at base of culm 0.7–1.2 mm. in diam.; perigynia 2.2–3.2 mm. long.

m. Perigynia 2.8–3.2 mm. long, elliptic-oblong or oblong-ovoid, olive green, spreading, firm-walled, in the lowest spikes 5–8 (3–12) in number; apex abruptly acute, firm, obscurely bidentate, minutely serrulate; base as broad as the body, conspicuously spongy; stigmas long, slender, usually reflexed but *not coiled; scales obtuse, often tawny*; lowest bract short, 5–30 (60) mm. long; broadest leaves about 1.3–1.8 (2) mm. wide, light green; fruit May 25–June 25......................8. *C. rosea* 116

m. Perigynia 2.2–2.8 (3) mm. long, elliptic-ovoid, deep green, *usually ascending, thin-walled*, in the lowest spikes 2–6 in number; apex more beak-like, less firm, plainly bidentate, strongly serrulate; base more obscurely spongy; stigmas short, less slender, usually coiled; scales obtuse, acute, or subaristate, *whitish, rarely slightly tawny*; lowest bract more conspicuous, 30–50 mm. long or a few on each plant shorter; broadest leaves 0.8–1.2 mm. wide, deep green; fruit June (10) 20–July 30...9. *C. radiata* 116

j. Perigynia not spongy at base and not puckered in drying, elliptic-ovoid (*2.8–3.2 mm. long*).

k. Inflorescence (1.5) 2–4 cm. long, usually interrupted; leaves stiff and wiry; perigynia ovoid-oval, very short-beaked, firm-walled; clumps smaller and more open than in the next species; rootstocks stout, somewhat creeping.............10. *C. Muhlenbergii*, var. *enervis* 116

k. Inflorescence 0.8–1.5 cm. long, dense; leaves softer; perigynia rhombic-ovoid, longer-beaked, thin-walled; plant cespitose....................11. *C. cephalophora* 116

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i. Leaves 4.5–8 mm. wide; sheaths loose.
j. Culms about 1 mm. in diam. below the inflorescence, not wing-angled; perigynia narrowly to broadly ovoid; scales silvery.
k. Inflorescence short, dense; perigynia 3.4–4 mm. long, 1.6–2 mm. wide, narrowly ovoid, the beak equaling the body; plant yellowish green........12. *C. cephaloidea* 116
k. Inflorescence elongated, interrupted; perigynia 3–3.5 mm. long, 1.8–2 mm. wide, broadly ovoid-orbicular, the beak shorter than the body; plant glaucous-green. 13. *C. sparganioides* 117
j. Culms about 2 mm. in diam. at summit, soft and wing-angled; perigynia narrowly ovoid; inflorescence dense; scales tawny at maturity..............14. *C. alopecoidea* 117
g. Spikes or branches of the inflorescence numerous.
h. Perigynia plano-convex, yellowish; plant green; bracts, or most of them, much exceeding the spikes, setaceous; scales pale; scarious part of sheath transversely rugose, white.
i. Leaves exceeding the culms; perigynia ovoid to broadly ovoid, 1.2–1.8 mm. wide, the beak nearly or quite as long as the body; inflorescence green............... 15. *C. vulpinoidea* 117
i. Leaves shorter than the culms; perigynia broadly ovoid, 1.6–2 (2.4) mm. wide, the beak much shorter than the body; inflorescence stramineous at maturity.
j. Perigynia 2.6–3.2 mm. long, usually nerved on the outer face; beak rather prominent........... 16. *C. annectens* 117
j. Perigynia 2.2–2.6 mm. long, usually nerveless; beak very short and point-like, and obscurely notched; inflorescence generally broader and shorter..16a. *C. a.*, var. *xanthocarpa* 117
h. Perigynia thick, often convex on both surfaces, brown; bracts, or all but the lowermost, shorter than the spikes; scales usually fuscous, frequently not covering the perigynia; scarious part of sheath not rugose, usually colored, at least in spots.
i. Leaves 1–3 mm. wide; inflorescence 1.5–5 cm. long; spikes obscurely branched.
j. Inflorescence dense, erect, appearing bristly from the radiating, bright, dark-colored, ovoid, 2–2.5 mm. long, perigynia; inner face of perigynia convex; scales short. 17. *C. diandra* 117
j. Inflorescence more lax and nodding, with a more chaffy appearance; perigynia more appressed, more lanceolate, duller brown, 2.5–3.5 mm. long, the inner face flat or concave; scales 3 mm. long...............18. *C. prairea* 117
i. Leaves 5–8 mm. wide; inflorescence 10–15 cm. long; spikes plainly branched.......................19. *C. decomposita* 118
e. Plants with long creeping rhizomes. (See also no. 10.)
f. Perigynia 3–5 mm. long, thin-margined, ovoid-lanceolate, the orifice strongly bidentate; inflorescence nodding; leaves 2–5 mm. wide, flat.....................................20. *C. Sartwellii* 118
f. Perigynia about 2 mm. long, not thin-margined, broadly ovoid, turgid, plano-convex, the orifice entire; inflorescence stiff, subcapitate; leaves narrow, involute................21. *C. chordorrhiza* 118
c. Spikes staminate at base, rarely at both base and apex (at apex only in no. 24). (Hyparrhenae.)

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d. Perigynia without winged margins, with definite thick margins, or marginless. (Elongatae.) (2d *d*, p. 107.)

e. Perigynia 4–5 mm. long, elliptic-lanceolate, contracted at base, spongy where in contact with the achene, slender-beaked, ascending; spikes 5–20 mm. long.

f. Spikes ovoid-oblong, silvery green; perigynia 1.5–1.9 mm. wide, faintly nerved; scales ovate; leaves 2–5 mm. wide. 22. *C. Deweyana* 118

f. Spikes linear, tawny; perigynia 1–1.3 mm. wide, strongly nerved; scales oblong; leaves 1–2.5 mm. wide............23. *C. bromoides* 118

e. Perigynia 2–4 mm. long, elliptic or ovoid or lanceolate, contracted or rounded at base, not spongy where in contact with the achene, short- or rather slender-beaked, ascending or spreading; spikes 9 mm. long or less.

f. Perigynia elliptic, slightly contracted at base, greenish glaucous, ascending-appressed; plant pale.

g. Perigynia 2.5–3.5 mm. long, finely many-nerved, turgid; spikes 2–5-flowered; inflorescence very open, often zigzag; plant laxly cespitose or stoloniferous.

h. Perigynia subterete, 2.5–2.8 mm. long, blunt; inflorescence straight; bracts short; spikes staminate at apex (exceptional in this group)................................24. *C. tenella* 118

h. Perigynia plano-convex, 3–3.5 mm. long, apiculate; inflorescence zigzag, usually exceeded by the lower bract; spikes staminate at base.................................25. *C. trisperma* 118

g. Perigynia about 2 mm. long, few-nerved, less turgid, plano-convex; spikes 7-many-flowered; inflorescence contracted or open, not zigzag; plant cespitose.

h. Leaves 2–4 mm. wide, glaucous; spikes many-flowered; perigynia apiculate.

i. Inflorescence 2–5 cm. long..................26. *C. canescens* 119

i. Inflorescence 5–15 cm. long, the lower spikes remote. 26a. *C. c.*, var. *disjuncta* 119

h. Leaves 1–2.5 mm. wide, green; spikes 7–10-flowered; perigynia distinctly short-beaked, more spreading....27. *C. brunnescens* 119

f. Perigynia ovoid, broadest below the middle, rounded or subcordate at base, pale yellowish or brown; plant pale or green.

g. Leaves flaccid, pale green; perigynia ascending, short-beaked, rounded at base, pale green, the margins not prominent; spikes aggregated ....[*C. arcta*] 119

g. Leaves somewhat more rigid, green, rarely paler; perigynia spreading, more definitely and acuminately beaked, rounded or truncate or subcordate at base, yellowish green, less cellular, the margins prominent; spikes aggregated or scattered.

h. Scales, at least the lower ones, nearly or quite equaling the perigynia, the lower scales obtuse, the upper ones acutish, all the scales more or less colored, firm; perigynia firm and moderately thick, triangular-ovoid, the nerves not prominent, those of the inner face more or less evident; beak of medium size, sharply serrulate and sharply notched; spikes (3) 4–6 (7), subcontiguous; broadest leaves 1.5–2 (2.5) mm. wide; sheaths truncate at orifice; anthers 1.2–2 mm. long. 28. *C. sterilis* 119

h. Scales distinctly shorter than the perigynia (or, if nearly equaling them, the sheath more or less V-shaped at summit and the perigynia narrower or the spikes more distant).

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i. Spikes not strongly echinate (due to the shorter or more appressed beaks); perigynia triangular-ovoid to broadly ovoid, if occasionally narrower the scales very obtuse; beaks, scales, spikes, and leaves various.

j. Scales obtuse, firm, usually colored; perigynia deltoid-ovoid or oblong-ovoid, thick, with thick margins and walls, weakly nerved and almost or quite nerveless on inner face; beak short or of medium size, slightly serrulate, obscurely notched; spikes 2–3 (4), contiguous or slightly distant; anthers 0.7–0.9 mm. long.........29. *C. interior* 119

j. Scales subacute, thin, often hyaline, usually pale; perigynia deltoid-ovoid to round-cordate-ovoid, with thinner walls, sharper-edged, and more sharply nerved on both faces; beak and spikes various; anthers 0.9–1.5 mm. long.

k. Beak indistinctly serrulate or subentire; orifice usually obscurely notched; broadest leaves 0.7–1.2 mm. wide; spikes 2–3, more or less distant..........30. *C. Howei* 119

k. Beak distinctly serrulate; orifice more plainly notched; broadest leaves 1–2 (2.5) mm. wide; spikes 3–5 mostly 3–4, usually distinct or distant........31. *C. incomperta* 119

i. Spikes strongly echinate; perigynia generally more rounded at base, ovoid-oval, nerved on both faces; beak rough, bidentate; scales firm, acute; spikes 5–6 rarely 3 or 7, more or less distant; broadest leaves 1.8–2.5 mm. wide. 32. *C. muricata* 120

d. Perigynia thin, scale-like, with winged margins. (Ovales.)

e. Perigynia 1–2 (2.3 in no. 40) mm. wide, lanceolate to ovoid.

f. Sheaths loose; blade 2.5–8 mm. wide.

g. Perigynia (3.5) 4–4.7 mm. long, 1.2–1.5 mm. wide, lanceolate.

h. Tips of the perigynia appressed; inflorescence stiff; spikes not conspicuously clavate-based.

i. Spikes approximate........................33. *C. tribuloides* 120

i. Spikes remote........................33a. *C. t.*, var. *turbata* 120

h. Tips of the perigynia spreading; inflorescence flexuous, nodding; spikes clavate-based..........................34. *C. projecta* 120

g. Perigynia 3–3.8 mm. long, 1.2–2 mm. wide, elliptic-ovoid to ovoid.

h. Spikes globose, very echinate; perigynia 1.2–1.5 mm. wide, crowded, radiating in all directions from the center. 35. *C. cristata* 120

h. Spikes ovoid-globose, less echinate, with a coarser appearance; perigynia 1.8–2 mm. wide, ascending-spreading, not reflexed, less numerous..............................36. *C. mirabilis* 120

f. Sheaths close; blade 0.5–3.5 mm. wide.

g. Perigynia lanceolate or narrowly lanceolate; spikes elliptic-ovoid.

h. Perigynia 4.1–4.7 mm. long, 1.5 mm. wide.

i. Spikes approximate but not crowded, the lower ones slightly separated..................................37. *C. scoparia* 120

i. Spikes all crowded into a dense subglobose head. 37a. *C. s.*, var. *condensa* 120

i. Spikes scattered, the lower ones remote; inflorescence more or less flexuous................37b. *C. s.*, var. *moniliformis* 121

h. Perigynia 3.6–3.8 mm. long, 0.7–1.3 mm. wide. 38. *C. Crawfordii* 121

g. Perigynia narrowly ovoid to oval (2–4.2 mm. long); spikes ovoid or oval.

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h. Spikes crowded, closely flowered, not clavate-based; perigynia narrowly ovoid (2–3 mm. long, 1.2–1.7 mm. wide). 39. *C. Bebbii* 121

h. Spikes distant, less densely flowered, clavate-based; inflorescence usually flexuous and nodding; perigynia ovoid.

i. Scales shorter than the perigynia, which are nerved or nerveless on the inner face.

j. Tips of the perigynia scarcely spreading; perigynia up to 3.3 mm. long.............................40. *C. tenera* 121

j. Tips of the perigynia spreading; perigynia up to 4.5 mm. long.........................40a. *C. t.*, var. *echinodes* 121

i. Scales equaling or exceeding the perigynia, which are strongly nerved on the inner face..................42. *C. foenea* 122

e. Perigynia 2.3–2.5 mm. wide, the body suborbicular; sheaths close; (scales shorter than the perigynia).

f. Perigynia 3.4 mm. long, the body very broadly ovoid or broadly oval; scales acute or blunt; spikes 5–8 mm. long, rounded. 41. *C. brevior* 121

f. Perigynia 4–5 mm. long, the body broadly obovoid; scales attenuate or aristate; spikes large, 8–15 mm. long, ovoid-conic...43. *C. alata* 122

b. Spikes normally unisexual, the uppermost wholly or in part staminate, the lower ones entirely pistillate or with a few staminate flowers at apex. (Eucarex.)

c. Achenes lenticular; stigmas 2.

d. Scales obtuse or acute, not aristate, rarely much exceeding the perigynia, frequently brown or fuscous.

e. Perigynia compressed, green or brownish.

f. Pistillate spikes drooping; tips of the perigynia often twisted; culms smooth, from cord-like matted rootstocks; basal sheaths not fibrillose; lower bract short.............................44. *C. torta* 122

f. Pistillate spikes erect; tips of the perigynia not twisted.

g. Culms from running rootstocks, nearly smooth; basal sheaths not fibrillose; plant very glaucous, substoloniferous; lower bract exceeding the staminate spike.................45. *C. aquatilis* 122

g. Culms in loose or dense stools, rough; basal sheaths fibrillose; plants green or slightly glaucous, densely cespitose; lower bract not exceeding the staminate spike.

h. Lowest pistillate spikes 3–7 cm. long.............46. *C. stricta* 122

h. Lowest pistillate spikes 0.5–2.5 cm. long. 46a. *C. s.*, var. *curtissima* 122

e. Perigynia subglobose, salmon color or golden yellow when mature; (plant low, glaucous)...............................79. *C. aurea* 128

d. Scales aristate or subulate-tipped, much longer than the more turgid perigynia, pale; pistillate spikes all peduncled and drooping.

e. Perigynia abruptly acute, widely spreading; sheaths smooth; larger leaves 6–8 mm. wide.

f. Staminate spike wholly staminate; pistillate spikes 6–10 cm. long; scales abruptly long-awned.........................47. *C. crinita* 122

f. Staminate spike usually part pistillate; pistillate spikes 3–5 cm. long; scales from almost awnless to long- and rather abruptly-awned. 47a. *C. c.*, var. *minor* 123

e. Perigynia gradually acute, ascending; scales gradually aristate; sheaths usually scabrous on back and on the hyaline part; larger leaves 7–11 mm. wide (5 mm. in small plants)......48. *C. gynandra* 123

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c. Achenes 3-angled; stigmas 3.
d. Perigynia with orifice entire or emarginate, the teeth if present soft. (2d *d*, p. 113.)
e. Lowest bract evaginate or very nearly so; orifice of the perigynium straight or nearly so. (2d *e*, p. 110.)
f. Perigynia not contracted into a pedicel-like base, beakless but in some cases very acute, if beaked the whole perigynium very scabrous.
g. Foliage glabrous but often scabrous.
h. Spikes oblong to subglobose, 2 cm. long or less; scales brown or dark brown; perigynia merely apiculate, dull glaucous-green, cellular-papillose.
i. Spikes sessile, the terminal one usually partly pistillate; scales dark, longer than the perigynia............49. *C. polygama* 123
i. Spikes peduncled, drooping, the terminal one wholly staminate.
j. Scales long-attenuate, much longer than the perigynia, narrow, exposing the perigynia; culms cespitose.
50. *C. paupercula* 123
j. Scales merely acute, as long as or longer than the perigynia, broad, concealing the perigynia; culms scattered; plant strongly stoloniferous; leaves generally narrower.
51. *C. limosa* 123
h. Spikes linear, 2.5–5 cm. long; scales pale; perigynia acute or beaked, pale or bright green.
i. Perigynia acute, scarcely beaked, smooth or only cellular-papillose; leaves 2–5 mm. wide, slightly rough; spikes spreading or drooping.....................52. *C. prasina* 123
i. Perigynia conspicuously beaked, very scabrous; leaves 6–12 mm. wide, very rough; spikes erect.........57. *C. scabrata* 124
g. Foliage, at least the lower sheaths, distinctly pubescent; perigynia bright green, not cellular-papillose.
h. Perigynia elliptic-oblong, plump, very obtuse, lustrous, many-nerved but not costate; terminal spike wholly staminate.
53. *C. pallescens* 123
h. Perigynia elliptic-oval or ovoid-oval, slightly flattened at least on the inner face, costate, obtuse or often subacute or even slightly beaked; terminal spike pistillate at summit.
i. Perigynia glabrous; spikes 4–5.5 mm. thick.
54. *C. triceps*, var. *hirsuta* 124
i. Perigynia pubescent, slightly smaller; spikes 3 mm. thick.
j. Spikes linear, attenuate at base, subacute, the lowest ones (12) 15–40 mm. long; perigynia elliptic-oval, costate; anthers 1.5–2.5 mm. long; most of the leaves shorter than the culm...............................55. *C. virescens* 124
j. Spikes oblong or oblong-linear, abrupt or rounded at base, obtuse, the lowest ones 5–18 mm. long; perigynia broadly oval; anthers (0.7) 0.9–1.6 mm. long; most of the leaves equaling or exceeding the culm...........56. *C. Swanii* 124
f. Perigynia contracted, stipe-like, and often spongy at base, or if not contracted then conspicuously beaked and smooth.
g. Foliage pubescent; leaves 3.5–8 mm. wide; perigynia pubescent.
58. *C. pubescens* 124
g. Foliage not hairy.
h. Pistillate spikes not drooping; perigynia pubescent (except in some forms of no. 62), 2–4 mm. long; beak rarely exceeding the body in length; plant low.

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i. Pistillate spikes all near the summit of the culm.
  j. Leaves 2.5 mm. wide or less.
    k. Plant stoloniferous; culms scattered; staminate spike prominent, 10–15 mm. long.......59. *C. pennsylvanica* 124
    k. Plant cespitose, more slender; staminate spike smaller, 5–12 mm. long............................60. *C. varia* 124
  j. Leaves 2.5–5.5 mm. wide; plant larger, cespitose. 61. *C. communis* 125
i. Pistillate spikes mostly half hidden among the densely tufted leaf bases, often also one or two near the staminate spike, rarely all stalked and exserted; leaves 1–4.5 mm. wide.
  j. Beak of the perigynium about as long as the body; culms usually 1–15 cm. high, with or without 1–2 pistillate spikes near the staminate spike................62. *C. umbellata* 125
  j. Beak of the perigynium relatively broader and only about half the length of the body; culms 1–5 cm. high, usually bearing the staminate spike only. 62a. *C. u.*, var. *brevirostris* 125
h. Pistillate spikes drooping; perigynia glabrous, 5–6 mm. long; beak very long and slender, much exceeding the body in length; plant 4–9 dm. high; (leaves 3–4 mm. wide). 63. *C. longirostris* 125

e. Lowest bract vaginate.
  f. *Perigynia ascending; bracts ascending or erect; basal sheaths pale brown to purple.* (2d *f*, p. 113.)
    g. Spikes (0.5–4.5 cm. long) erect or ascending, or if strongly drooping the perigynia either puberulent or 35–50-nerved; perigynia almost nerveless or 12–50-nerved, dull and glaucous, or lustrous, apex straight or oblique; terminal spike wholly staminate, except sometimes in no. 66. (*2d g*, p. 112.)
      h. Perigynia sparsely puberulent, strongly contracted and stipitate below the middle, nearly nerveless; scales truncate-aristate, usually purple; spikes scattered, drooping; sheaths with very short blades; staminate spike and basal sheaths purple. 60. *C. pedunculata* 125
      h. Perigynia glabrous.
        i. Leaves 1 mm. wide or more; staminate spike not overtopped by the lower pistillate spikes. (2d *i*, p. 112.)
          j. Perigynia sharply triangular, closely 35–50-nerved.
            k. Spikes erect, nearly sessile; culms erect or arching.
              l. *Cauline sheaths bladeless, more or less purple-tinged*; basal sheaths and staminate spike purple; leaves 1.5–3 cm. wide, semi-evergreen..........67. *C. plantaginea* 126
              l. Cauline sheaths blade-bearing, green.
                m. Perigynia 5–6.5 mm. long; staminate spike dark; leaves 0.8–1.7 cm. wide, green or slightly glaucous; basal sheaths usually purple; culms 3–7 dm. high. 68. *C. Careyana* 126
                m. Perigynia 2–4 mm. long; staminate spike pale; leaves 1–3 cm. wide, short, glaucous; basal sheaths pale; culms 1–3.5 dm. high............69. *C. platyphylla* 126
            k. Spikes drooping on filiform peduncles; culms weak, strongly arching; sheaths and staminate spike pale.

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l. Main leaves 6–12 mm. wide, glaucous; perigynia 3–4 mm. long; pistillate spikes bearing 1–2 staminate flowers at the base.................70. *C. laxiculmis* 126

l. Main leaves 2–5 mm. wide, very green; perigynia 2.5–2.8 mm. long; pistillate spikes without staminate flowers............................71. *C. digitalis* 126

j. Perigynia obtusely triangular, the faces more convex; nerves various.

k. Perigynia narrowed or substipitate at base; orifice or beak often more or less oblique; spikes remote or contiguous. (2d *k*, p. 112.)

l. Perigynia 40–50-nerved, slender-beaked; scales rough-awned.

m. Sheaths pubescent; perigynia 4–5 mm. long; leaves 3–7 mm. wide................72. *C. Hitchcockiana* 126

m. Sheaths glabrous; perigynia 4 mm. long; leaves 2–4.5 mm. wide..................73. *C. oligocarpa* 127

l. Perigynia 15–30-nerved; scales subtruncate, some apiculate.

m. Plant stoloniferous; leaves long and narrow; spikes very distant.......................81. *C. tetanica* 128

m. Plant cespitose; leaves shorter and often broader; spikes aggregated or distant.

n. Perigynia strongly and often sharply (21) 24–45-nerved.

o. Perigynia with a short and rather broad apex or point which is turned more or less to one side.

p. Spikes alternately flowered; scales truncate or retuse, muticous, subflabellate at apex; staminate spike very slender, inconspicuous, equaled or exceeded and often hidden by the aggregated pistillate spikes; culms broad, almost winged, the angles smooth or slightly erose; bracts broad, erect; leaves very broad (10–40 mm. wide)..................74. *C. albursina* 127

p. Spikes denser, perigynia much overlapping; scales subtruncate, rounded, or acute, usually cuspidate; staminate spike conspicuous or inconspicuous; culms narrower, less broadly margined, the angles more or less erosely or retrorsely serrulate-scabrous; bracts and leaves narrow or sometimes rather broad.

q. Basal sheaths brown; foliage pale; bracts usually overtopping the culm; spikes more or less aggregated at summit of culm; *scales pale; axis of spikes usually smooth*; tip of perigynium either abruptly or only slightly bent...............75. *C. blanda* 127

q. Basal sheaths purple, but often weathering away; foliage brighter or yellow-green; bracts rarely overtopping the culm; spikes scattered; scales often colored; axis of spikes usually granulose; perigynia more *fusiform, the tip more strongly recurved*; plant generally more slender.
76. *C. laxiflora* 127

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o. Perigynia with a narrow and sharp, more beak-like, straight or only slightly oblique, apex; spikes alternately flowered, not crowded, the staminate spike conspicuous; culms smooth or rarely slightly erose; bracts usually exceeding the culm; basal leaves often broad.
77. *C. anceps* 127

n. Perigynia obscurely 15–21-nerved, ellipsoidal, the tip slender and straight or slightly oblique, rather abrupt; culms retrorse-scabrous on the angles, rarely almost smooth; foliage deep green; bracts generally surpassing the culm..78. *C. leptonervia* 127

k. Perigynia rounded at base or at least not stipitate, obtuse at apex; spikes remote.

l. Perigynia with 12–24 nerves.

m. Plant stoloniferous; spikes loosely flowered; perigynia inconspicuously nerved.

n. Lower sheaths purple, mostly bladeless; stolons superficial; plants of rich humus in woodlands.
80. *C. Woodii* 128

n. Lower sheaths pale, mostly blade-bearing; stolons deep-seated; plants of springy, marly places.
81. *C. tetanica* 128

m. Plant cespitose; spikes densely flowered; perigynia conspicuously nerved.

n. Perigynia plump-ovoid, 1.5–2 mm. in diam.
82. *C. granularis* 128

n. Perigynia oblong, slightly more pointed, less inflated, 1–1.3 mm. in diam.
82a. *C. g.*, var. *Haleana* 128

l. Perigynia with 27–50 nerves, oblong to elliptic-ovoid; plant cespitose; spikes densely flowered.

m. Leaves green; perigynia 4.5–5 mm. long; larger spikes 5–12-flowered..................83. *C. grisea* 128

m. Leaves very glaucous, firmer; perigynia 3–4 mm. long; larger spikes 15–25-flowered.
84. *C. glaucodea* 129

i. Leaves capillary; pistillate spikes clustered at summit of stem, and most of them overtopping the minute staminate spike.
85. *C. eburnea* 129

g. Spikes (0.5–8 cm. long) drooping, or if erect the terminal one partly pistillate; perigynia 5–18-nerved, glabrous, lustrous, apex straight.

h. Terminal spike wholly staminate; pistillate spikes drooping; perigynia very acute or beaked; (sheaths glabrous).

i. Spikes 0.5–1.5 cm. long; scales broad and very obtuse; perigynia 2–3 (3.5) mm. long; leaves 2 mm. wide; basal sheaths pale...............................86. *C. capillaris* 129

i. Spikes 2–6 cm. long; scales oblong or ovate-lanceolate, subacute; perigynia 3–5 mm. long; leaves 3–10 mm. wide; basal sheaths purple.

j. Broadest basal leaves 3–5 mm. wide; perigynia much longer than the scales (5 mm. long)..88. *C. debilis*, var. *Rudgei* 129

j. Broadest basal leaves 5–10 mm. wide; perigynia slightly exceeding the scales (3–4 mm. long).......87. *C. arctata* 129

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h. Terminal spike partly pistillate (see also no. 88); basal sheaths purple.
  i. Sheaths pubescent; *perigynia acute; spikes ascending or spreading*................................89. *C. aestivalis* 130
  i. Sheaths glabrous; perigynia obtuse; spikes usually drooping. 90. *C. gracillima* 130
f. Perigynia widespread or reflexed, especially the beak; bracts divaricate; basal sheaths brown; (spikes subglobose or oblong, sessile or nearly so).
  g. Perigynia 2–3 mm. long, greenish, the beak much shorter than the body; spikes oblong, 4–8 mm. in diam..91. *C. Oederi*, var. *pumila* 130
  g. Perigynia 4–6 mm. long, yellow when ripe, the beak equaling the body; spikes subglobose, 8–15 mm. in diam.
    h. Perigynia 5–6 mm. long; scales and tips of the perigynia brown; leaves 2–5 mm. wide............................92. *C. flava* 130
    h. Perigynia 4 mm. long; scales and tips of the perigynia pale; leaves 1–3 mm. wide......................93. *C. cryptolepis* 130
d. Perigynia with orifice rigidly bidentate.
  e. Perigynia pubescent; plant stoloniferous; (staminate spikes usually more than 1; pistillate spikes scattered).
    f. Teeth of the perigynia less than 1 mm. long; perigynia broadly ovoid, short-beaked.
      g. Leaves very narrow, involute-filiform...........94. *C. lasiocarpa* 130
      g. Leaves broader, flat, 2–5 mm. wide............95. *C. lanuginosa* 130
    f. Teeth of the perigynia more than 1 mm. long; perigynia ovoid or ovoid-lanceolate, the beak nearly as long as the body.
      g. Plant hairy; staminate scales hairy; perigynia ovoid; culms obtusely angled...................................96. *C. hirta* 131
      g. Plant not hairy; staminate scales not hairy; perigynia lanceolate or ovoid-lanceolate; culms acutely angled.....97. *C. trichocarpa* 131
  e. Perigynia not hairy, usually large and inflated; plant stoloniferous or cespitose.
    f. Staminate spikes 2 or more (in no. 101 only the upper 1 or 2 wholly staminate); scales of the pistillate spikes not rough-awned but often very acute.
      g. Perigynia spindle-shaped, scarcely inflated, firm; plant stoloniferous..............................98. *C. riparia,* var. *lacustris* 131
      g. Perigynia ovoid, inflated and papery.
        h. Leaves 3–5 mm. wide; plant cespitose; culms sharply angled, not spongy-thickened at base; sheaths not nodulose; spikes erect, scattered; perigynia ascending.
          i. Perigynia 4 mm. thick or less....99. *C. vesicaria,* var. *monile* 131
          i. Perigynia 5–6.5 mm. thick.............100. *C. Tuckermani* 131
        h. Leaves 4–10 mm. wide; plant cespitose; culms acutely angled, not spongy-thickened; sheaths scarcely nodulose; spikes spreading; lower perigynia reflexed (see also 3d *h*).
          i. Spikes contiguous.........................101. *C. retrorsa* 131
          i. Spikes distant, the lower ones peduncled, all more slender. 101a. *C. r.,* var. *Bradleyi* 132
        h. Leaves 4–12 mm. wide; plant stoloniferous; culms scattered, obtusely angled, spongy at base; sheaths nodulose; spikes erect, scattered, dense; perigynia spreading but not reflexed, shorter than in the last-mentioned species.

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i. Perigynia abruptly beaked, 3–6 mm. long; pistillate spikes 6–12 mm. thick............................102. *C. rostrata* 132

i. Perigynia more gradually beaked, 5–10 mm. long; pistillate spikes 10–20 mm. thick...........102a. *C. r.*, var. *utriculata* 132

f. Staminate spike solitary; scales of the pistillate spikes often rough-awned; plant cespitose.

g. Perigynia lanceolate or conic-subulate, slightly inflated, 10–15 mm. long; spikes scattered; leaves 9–14 mm. wide, yellowish green ....103. *C. folliculata* 132

g. Perigynia ovoid-lanceolate or ovoid, more inflated and papery; spikes more nearly contiguous; leaves 3–9 (12 in no. 105) mm. wide, green.

h. Perigynia 4–8 mm. long; pistillate spikes spreading or drooping, the scales rough-awned.

i. Teeth 0.5 mm. long or more; perigynia more or less reflexed, slightly inflated, strongly and closely 15–20-ribbed; (spikes drooping).

j. Teeth erect or spreading, 0.5–1 mm. long; perigynia 4–5 mm. long; beak shorter than the body.
104. *C. Pseudo-Cyperus* 132

j. Teeth recurved, 1.2–2 mm. long; perigynia 6 mm. long; beak equaling or longer than the body..105. *C. comosa* 132

i. Teeth 0.5 mm. long or less; perigynia spreading.

j. Perigynia 15–20-nerved, 6 mm. long, moderately inflated, widely spreading; spikes subtruncate at base; staminate scales awned........................106. *C. hystericina* 132

j. Perigynia 8–10-nerved; beak less toothed.

k. Spikes elongated-cylindrical, 3–7 cm. long, 8–13 mm. thick, tapering and abortively flowered at base; perigynia 5 mm. long, about 8-nerved, moderately inflated; staminate scales awnless...........107. *C. Schweinitzii* 133

k. Spikes cylindrical, 1.5–6 cm. long, 15–20 mm. thick, subtruncate at base; perigynia 7–8 mm. long, 10-nerved, much inflated; staminate scales rough-awned.
108. *C. lurida* 133

h. Perigynia 10–17 mm. long, papery-inflated (less inflated in no. 110a); pistillate spikes erect or ascending, the scales awned or awnless.

i. Perigynia ascending.

j. Pistillate spikes oblong, many-flowered, very large and heavy.

k. Pistillate spikes approximate, clustered about the sessile staminate spike ....109. *C. lupulina* 133

k. Pistillate spikes scattered, some or all peduncled; staminate spike more conspicuous, usually peduncled; perigynia more spreading......109a. *C. l.*, var. *pedunculata* 133

j. Pistillate spikes globose or short-ovoid, 1–13-flowered.

k. Perigynia 5–8 mm. thick, 10–15 mm. long.
110. *C. intumescens* 133

k. Perigynia 3–5 mm. thick, 12–17 mm. long.
110a. *C. i.*, var. *Fernaldii* 133

i. Perigynia radiating in all directions from a common center; spikes globose..............................111. *C. Grayii* 134

Subgenus 1. *Primocarex*

1. **C. leptalea** Wahl. (*C. polytrichoides* of Cayuga Fl.)

Boggy and springy places; common. June.

Lab. to Alaska, southw. to Pa., Fla., La., Tex., Colo., and Oreg.; frequent on the Atlantic Coastal Plain.

2. **C. pauciflora** Lightf.

In the sphagnum of acid peat bogs; rare. June.

McLean Bogs (*D.*!); Malloryville Bog; sphagnum clumps, Mud Creek, Freeville; Junius (*Sartwell*).

Lab. to Alaska, southw. to Conn., Pa., Mich., Minn., and Wash.

[**C. gynocrates** Wormsk.

Swamps, Savannah, Wayne Co. (*Sartwell* in Herb. Hamilton Coll.), according to Paine's *Flora of Oneida Co., N. Y.* Not seen since.]

Subgenus 2. *Vigna*

Section 1. *Acroorrhenae*

3. **C. stipata** Muhl.

Meadows and the borders of bogs, in rich, slightly acid or neutral, soils; very common. June.

Newf. to B. C., southw. to Fla., Tenn., Mo., N. Mex., and Calif., including the Atlantic Coastal Plain.

4. **C. laevivaginata** (Küken.) Mackenzie.

Boggy meadows and springy places; frequent. June.

Enfield Glen; hillside n. of Caroline Center; Ellis Hollow Swamp; border of Mud Pond, McLean Bogs; Mud Creek, Freeville; Big Gully.

Mass. to N. Y. and N. C.

The strongest of the characters cited by Fernald (Rhodora **17**: 231. 1915) appears to be the length of the perigynium (5–7 mm. long in *C. laevivaginata*, 4 mm. long in *C. stipata*). The truncate firm upper border of the sheath is a good character also. The lack of puckering in the sheath is fairly constant, the sheath in *C. laevivaginata* being occasionally puckered, while in *C. stipata* the puckering is sometimes absent. The leaves of *C. laevivaginata* do not seem to be narrower than those of *C. stipata*, as stated by Fernald.

5. **C.** CONTIGUA Hoppe. (See Bul. Torr. Bot. Club **50**: 346. 1923. *C. muricata* of Amer. authors.)

Dry sandy fields and roadsides, mostly in calcareous or saline localities; rare. June.

Streets and lawns, East Hill, Ithaca, and C. U. campus; shore of Cayuga Lake at Howland Point; Stone Mill, Union Springs; n. e. of Montezuma village. First collected in 1918, at Howland Point.

S. Me. to Ohio, southw. to Va. Naturalized from Eu.

6. **C. retroflexa** Muhl.

Dry rocky and stony soil of weathered residual sandstone; scarce. June.

Upper terrace, South Hill; s. of Van Natta Dam, Six Mile Creek; n. w. of Eddy Dam (*D.*); Renwick slope and McKinney slope; Esty Glen; Taughannock Gorge.

Mass. to Mich., southw. to Fla. and Tex.; apparently rare or absent on the Coastal Plain.

7. **C. convoluta** Mackenzie. (Bul. Torr. Bot. Club **43**: 423. 1916. *C. rosea* of Gray's Man., ed. 7, and of Cayuga Fl.)

Dry grassy banks and woods, on rich sandy, gravelly, or stony soils, in acid and apparently also in calcareous regions; frequent. May 25–June 20.

Hilltop, Newfield-Ithaca town line; South Hill; Six Mile Creek; Fall Creek; slope of Cayuga Lake, Ithaca to Aurora; Summer Hill; Black Brook, Tyre; apparently rare or infrequent on the hills and in the McLean region.

Me. to Man., southw. to Ga., Kans., and Mo.; scarce on the Coastal Plain.

Mackenzie's treatment (*l. c.*) of *C. rosea* and its relatives has been found satisfactory for the local plants, though some measurements and the emphasis on certain characters have been changed. The three species seem abundantly distinct.

8. **C. rosea** Schk.

Damp grassland in woods and around swamps, apparently chiefly in calcareous regions; scarce. May 25–June 25.

Michigan Hollow Swamp; Beech Woods, Six Mile Creek; hills n. e. of Caroline; around McLean Bogs; arbor vitae swamp e. of Clyde; Lowery Ponds.

Que. to N. Dak., southw. to Ga. and La., invading the Coastal Plain.

9. **C. radiata** (Wahl.) Small.

Dry scrubby hillsides and thickets, in gravelly or somewhat sandy, not clearly calcareous, soils; apparently rare. June (10)20–July 30.

N. of Caroline Center, and in the narrows between Slaterville and Caroline Center (*A. J. E., K. M. W., & L. F. Randolph*).

Me. to N. Y. and Ky., southw. to N. C. and Tenn., chiefly in the mts.

The *C. rosea*, var. *radiata* and var. *minor*, of Gray's Man., ed. 7, were each composed of both *C. rosea* and *C. radiata* as here interpreted. It is impossible to determine the var. *minor* and the var. *radiata* of Dudley's *Cayuga Flora.*

10. **C. Muhlenbergii** Schk., var. **enervis** Boott. (*C. plana* Mackenzie.)

Dry residual soil derived from sandstone rocks and mixed with some clay; rare. June.

Cliff crests s. of Esty Glen.

S. Me. to Minn., southw. to Fla. and Tex.; infrequent on the Coastal Plain.

The characters given by Mackenzie (see Bul. Torr. Bot. Club **50**:350. 1923) to separate this as a species from true *C. Muhlenbergii* do not all seem to hold true. The form does not appear to be specifically distinct. The most distinctive characters are a thinner-walled, less nerved, and more silvery perigynium, and thinner scales. The soil in which this variety grows here is heavier than the very light sand in which *C. Muhlenbergii* is usually found, but it is not markedly calcareous.

11. **C. cephalophora** Muhl.

Dry rocky exposed banks, in stony noncalcareous soils over sandstone and shale; common. June.

Especially frequent about Ithaca, along the slopes of Cayuga Lake; rare in the McLean region.

Me. to Ont. and Man., southw. to Fla. and Tex.; frequent on the Coastal Plain.

Similar to the two species next following, but the leaves are narrower, and the small, short, and broad perigynia of the dense head are scarcely longer than the scales.

12. **C. cephaloidea** Dewey. (*C. sparganioides*, var. *minor*, of Cayuga Fl., probably.)

Damp thickets, banks, rich wooded slopes, and alluvial woodlands, in calcareous regions; frequent. June.

West Danby road, just s. of Enfield Creek; n. of Lick Brook; Six Mile Creek, opposite Beech Woods; Waterburg; Fall Creek; Taughannock Gorge; Salmon Creek, n. of Ludlowville; wet meadow n. e. of Freeville; Summer Hill; and elsewhere.

N. B. to Wis., southw. to Pa.; chiefly or entirely inland.

Frequently confused with the species next following, from which it differs in the more yellow-green color, short dense inflorescence, narrower perigynia, and shorter scales (perigynia narrowly ovate; beak about as long as the body; scale shorter than the body).

13. **C. sparganioides** Muhl.

Rich wooded slopes, mostly in calcareous regions; frequent. June.

Michigan Hollow; Inlet Valley slopes; Six Mile Creek; McGowan Woods; Mud Creek woods; McLean; Salmon Creek ravine; Paine Creek; Big Gully; w. of Howland Island; and elsewhere.

N. H. to Ont., southw. to Va. and Mo.; apparently absent on the Coastal Plain.

14. **C. alopecoidea** Tuckerm.

Ditches and meadows, in gravelly calcareous regions; scarce. June.

Spencer Lake; near East Ithaca station (*D.*!); e. of Freeville (*D.*); near Marl Creek, Cortland (*D.*); Myers Point (*D.* in C. U. Herb.); n. of Ludlowville (*F. C. Curtice*); Taughannock Point; glen one mile s. of Willets; Union Springs; Frontenac Island (*D.*); West Junius (*D.*).

Me. to Ont. and Mich., southw. to Pa. and Ill.; absent in granitic N. E. and along the coast.

15. **C. vulpinoidea** Michx.

Open swales and meadows, in both calcareous and noncalcareous soils; common, and generally distributed. July.

Newf. to Man., southw. to Fla., La., Nebr., and Tex., including the Coastal Plain.

16. **C. annectens** Bickn. (See Bul. Torr. Bot. Club **23**: 23. 1896. Britton & Brown's Ill. Fl., ed. 2, **1**: 369. 1913. *C. setacea* Dewey, var. *ambigua* (Barratt) Fernald.)

Dry or damp sandy acid soils; rare. July.

South Hill Marsh, with *Prunus susquehanae* and *Lyonia ligustrina*; e. of Slaterville Swamp, abundant; hilltops s. w. of Dryden Lake and n. and w. of Caroline Center; n. e. of Montezuma village.

Me. to N. Y. and Md., mostly on the Coastal Plain; also in Iowa and Mo.

This species differs from *C. vulpinoidea* in the shorter leaves and the broader, shorter-beaked perigynia, the beak being shorter than the body.

16a. **C. annectens** Bickn., var. **xanthocarpa** (Bickn.) Wiegand. (See Rhodora **24**: 74. 1922.)

In situations similar to the preceding; rare.

Sedgy field e. of Slaterville Swamp, 1919.

W. N. H. and cent. Conn. to Ill. and Iowa, southw. to Va., Ohio, and Mo.

17. **C. diandra** Schrank. (*C. teretiuscula* of Cayuga Fl.)

Very wet places in marl bogs, and on the shores of marl ponds; scarce. June.

Summit Marsh; Larch Meadow (*D.*); Fleming Meadow; Freeville Bog (*D.*!); Mud Pond, McLean Bogs (*D.*!); Lake Como (Locke Pond, *D.*).

Lab. to Alaska, southw. to Conn., Pa., Mich., Nebr., and B. C.; rare on the Atlantic Coastal Plain. Found also in Eurasia.

18. **C. prairea** Dewey. (See Britton & Brown's Ill. Fl., ed. 2, **1**: 370. 1913. *C. teretiuscula*, var. *major*, of Cayuga Fl. *C. t.*, var. *ramosa*, of authors. *C. diandra*, var. *ramosa*, of Gray's Man., ed. 7.

In situations and soils similar to the last-named; scarce. June.

Larch Meadow; Fleming Meadow; Mud Pond, McLean Bogs; Lake Como; Spring Lake; Lowery and Newton Ponds.

E. Que. to B. C., southw. to Conn., Pa., Ky., Ill., Minn., and Utah; apparently absent on the Atlantic Coastal Plain.

A sufficiently well-marked species, differing from the last-named in the looser nodding inflorescence, the longer, browner, more lanceolate perigynia (2.5–3.5 mm. long) which are flat or concave on the inner face, and the longer scales (3 mm. long) which give the spikes a chaffy appearance. *C. diandra* has a strict bristly inflorescence, with short (2 mm. long), less conspicuous scales, and with more evident perigynia, 2–2.5 mm. long, bright, dark-colored, and ovoid, with convex inner faces.

19. **C. decomposita** Muhl.

"Junius," *Sartwell* in Herb. (*D.*); not seen there since.

N. Y. to Mich., southw. to Fla. and La.; apparently absent on the Coastal Plain.

20. **C. Sartwellii** Dewey. (*C. disticha* of Cayuga Fl.)

Marl bogs; rare. June.

"Junius" (*Sartwell*); Lowery Ponds (*D.*!); n. of Montezuma village.

Cent. N. Y. to B. C., southw. to Ohio, Ill., Ark., Iowa, and Utah.

21. **C. chordorrhiza** Ehrh.

Peat bogs and boggy shores; very rare.

Junius ("*Sartwell* in *C. U. Herb.*, also in *Herb. Ham. Coll.* and *Cat. of 1844*" D., also *Sartwell* in Gray Herb.); not found since. Reported from about nine other stations in N. Y. State.

Que. to B. C., southw. to Me., Vt., Pa., Ill., and Iowa. Found also in Eurasia.

Section 2. *Hyparrhenae*

Subsection A. *Elongatae*

22. **C. Deweyana** Schwein.

Dry or damp woodlands, in humus, probably only in calcareous regions; frequent. June–July 15.

Spencer; Newfield; n. of Enfield Falls; Six Mile Creek; McGowan Woods; s. of Waterburg; e. of Ludlowville; s. e. corner of Dryden; Mud Creek, Freeville; McLean Woods; Black Brook, Tyre; and elsewhere.

Que. to B. C., southw. to Pa., Mich., Wis., and Ariz.; rare or absent on the Atlantic Coastal Plain.

23. **C. bromoides** Schk.

Swales and meadows about swamps, in more or less calcareous soils; common. June.

Michigan Hollow Swamp (*D.* in C. U. Herb.); Fall Creek (*F. C. Curtice* in C. U. Herb.); Indian Spring marsh; Freeville (*D.* in C. U. Herb.); Mud Creek, Freeville; near Mud Pond, McLean Bogs; near Ludlowville; Howland Island; and elsewhere.

N. S. to Ont. and Mich., southw. to Fla. and La.; infrequent on the Coastal Plain.

24. **C. tenella** Schk.

Mossy marl bogs and springs; frequent. May 20–June.

Key Hill swamp; Michigan Hollow Swamp; South Hill Marsh; Caroline Depot bog; Ellis Hollow; Fir Tree Swamp, Freeville; Mud Creek, Freeville; Beaver Brook.

Newf. to B. C., southw. to n. N. J., Pa., Mich., Colo., and Calif.; rare or absent on the Atlantic Coastal Plain. Found also in Eurasia.

25. **C. trisperma** Dewey.

Among shrubs in and around peat bogs; frequent. June.

Spruce Swamp, Enfield (*D.*); Freeville; Woodwardia Bog; Malloryville Bog; McLean Bogs; Junius peat bogs; Duck Lake; and elsewhere.

Newf. to Sask., southw. to Md., the Great Lakes, and Nebr., including the Coastal Plain.
The narrow-leaved extreme form (var. *Billingsii* Knight) occurs at Junius.

26. **C. canescens** L. (Including var. *subloliacea* Laestad.)
Peat bogs; infrequent. June.
Freeville, n. of village; McLean Bogs; Junius peat bogs; and elsewhere.
Lab. to B. C., southw. to Conn., Va., Ohio, and in the Rocky Mts. to N. Mex. (?), including the Atlantic Coastal Plain. Found also in Eurasia.

26a. **C. canescens** L., var. **disjuncta** Fernald.
In situations similar to the preceding; apparently rare. June.
South Hill Marsh.
Lab. to Wis., southw. to Pa. and Ohio.

27. **C. brunnescens** (Pers.) Poir. (*C. canescens*, var. *vitilis*, of Cayuga Fl.)
Meadows and springy places, in calcareous soils; infrequent. June.
Michigan Hollow Swamp (*D.*!); Spruce Swamp, Enfield (*D.*); Dryden-Lansing Swamp (*D.*); Freeville Bog (*D.*); borders of McLean Bogs (*D.*!); open pasture, Beaver Brook.
Lab. and Newf. to B. C., southw. to N. C., Mich., and in the Rocky Mts.; apparently absent on the Atlantic Coastal Plain. Found also in Eu.
This species differs from the last preceding one in the very slender green leaves, few-flowered spikes, and narrower, more beaked perigynia, which are more spreading at maturity.

[**C. arcta** Boott.
A plant from a swale at s. edge of woods n. e. of Etna station (*A. Gershoy*) seems to be this species, but is too young for certain determination. Found in Cortland Co.]

28. **C. sterilis** Willd. (*C. sterilis*, in part probably, of Cayuga Fl.)
Marl bogs; rare. June.
"Junius" (*Sartwell* in Gray Herb.); Newton and Lowery Ponds.
Newf. and Que. to Minn., southw. to n. N. J. and n. Pa.
Not recognized in Gray's Man., ed. 7, the plant so called being *C. atlantica* Bailey.

29. **C. interior** Bailey. (*C. scirpoides* of Gray's Man., ed. 7. *C. echinata*, var. *microcarpa*, of Cayuga Fl.)
Borders of peat bogs, and apparently also in marl; common. June.
Summit Marsh; headwaters of Inlet; Larch Meadow; Freeville Bog; McLean Bogs; Junius peat bogs; Spring Lake; and elsewhere.
Lab. and Newf. to Hudson Bay and B. C., southw. to n. N. J., N. Y., Mo., and n. Calif.; apparently also on the Atlantic Coastal Plain.

30. **C. Howei** Mackenzie. (*C. scirpoides*, var. *capillacea*, of Gray's Man., ed. 7.)
In sphagnum bogs; scarce. June.
Ringwood; Freeville Bog; Junius; Westbury Bog.
N. S. and N. H. to N. J. and Md., and in cent. N. Y.; mostly coastal.

31. **C. incomperta** Bickn. (*C. sterilis*, in part, of Gray's Man., ed. 7.)
Boggy noncalcareous places; rare. June.
South Hill Marsh (with *C. folliculata*), 1919. [Also in Oswego Co.]
N. H. to Ga., Miss., and Tex., also in cent. N. Y., Ind., and Tenn.; chiefly coastal.
Most central New York specimens heretofore named "*C. Atlantica*" and "*C. sterilis*" are of this species.

32. **C. muricata** L. (See Bul. Torr. Bot. Club **50**: 346. 1923. Rhodora **19**: 154. 1917. *C. stellulata*, vars. *excelsior* and *cephalantha*, of Gray's Man., ed. 7. *C. echinata* of Cayuga Fl.)

Swales about bogs and in meadows, especially on gravelly soils; scarce. June 20–July.

Summit Marsh; meadow w. of Woodwardia Bog; Freeville Bog.

Newf. to Wis., southw. to D. C. and N. Y., including the Coastal Plain.

The form found here is var. *cephalantha*, not the typical form of Eu.

Subsection B. *Ovales*

33. **C. tribuloides** Wahl. (*C. lagopodioides* of Cayuga Fl.)

Meadows, ditches, and on the borders of pools, in various soils; not uncommon. July.

N. B. to Sask., southw. to Fla. and Ariz.; apparently infrequent on the Coastal Plain.

33a. **C. tribuloides** Wahl., var. **turbata** Bailey.

Borders of swamps; occasional. July.

Michigan Hollow Swamp; and elsewhere.

Range same as that of the species.

34. **C. projecta** Mackenzie. (See Bul. Torr. Bot. Club **35**: 264. 1908. *C. tribuloides*, var. *reducta* Bailey. *C. lagopodioides*, var. *moniliformis*, of Cayuga Fl.)

Swales, ditches, and meadows, mostly in gravelly, not clearly acid, regions; frequent. June–July.

Spencer Lake; Michigan Hollow (*D.*); Slaterville Swamp; Freeville Bog; McLean Bogs (*D.*!); Chicago Bog; swamps in Conquest; and elsewhere.

Newf. to N. Dak., southw. to D. C. and Ill.; rare or absent on the Coastal Plain.

35. **C. cristata** Schwein.

Marshes, swales, and along streams, in rich alluvial and more or less calcareous or saline soils; common. June 20–Aug. 10.

Michigan Hollow Swamp; s. of Caroline Depot; McLean district; marshes and gravelly points along Cayuga Lake; Montezuma salt flats; Westbury marl meadow; and elsewhere.

E. Mass. and Vt. to B. C., southw. to Va. and Mo.; rare or absent on the Atlantic *Coastal Plain*.

36. **C. mirabilis** Dewey. (*C. cristata*, var. *mirabilis*, of Cayuga Fl.)

Damp grassland, along roadsides and borders of woods and in thickets, in various heavy nonacid soils; frequent. June.

Brook n. e. of Spencer Lake; Lick Brook and Inlet Valley s.; South Hill (*D.*); Cascadilla woods; Cayuga Heights, often abundant; Renwick (*D.*); Malloryville; near Esty Glen; s. of Waterburg; s. w. of Mecklenburg; Union Springs; w. of Howland Island.

Que. (?) and Me. to Man., southw. to N. C. and Mo.; rare or absent on the Coastal Plain.

37. **C. scoparia** Schk.

Low, often exsiccated, grounds, in various soils; very common. June 20–July.

Newf. to Sask. and Oreg., southw. to Fla. and Colo., including the Atlantic Coastal Plain.

37a. **C. scoparia** Schk., var. **condensa** Fernald. (Var. *intermedia* of Cayuga Fl.?)

In situations similar to the preceding; occasional.

Summit Marsh (*D.*); w. of Key Hill; Fleming Meadow (*D.*); Ringwood; state road between McLean Bogs and South Cortland; and probably elsewhere.

Newf. to Ont., southw. to Conn.

37b. **C. scoparia** Schk., var. **moniliformis** Tuckerm.

In situations similar to the preceding; occasional.

Pasture on South Hill; Caroline Center; near Slaterville Swamp; Mud Creek, Freeville.

Range about the same as that of the species.

38. **C. Crawfordii** Fernald.

Swales and exsiccated places; apparently rare. June 20–July.

S. w. of Duck Lake.

Newf. to B. C., southw. to n. Conn., N. Y., and Mich., apparently including the northern Atlantic Coastal Plain.

39. **C. Bebbii** Olney.

Swales and exsiccated places in meadows and pastures, in gravelly or somewhat clayey nonacid soils; frequent. June 20–July.

Michigan Hollow; Stewart Park; Freeville Bog; Mud Creek, Freeville; Mud Pond, McLean Bogs; East Genoa; between Willets and Paine Creek; Junius marl ponds; Tyre; Montezuma; and elsewhere.

Newf. to n. Minn., B. C., and Alaska (?), southw. to N. J., Ill., and Colo.; rare or absent on the Atlantic Coastal Plain and in granitic N. E.

40. **C. tenera** Dewey. (See Bul. Torr. Bot. Club **42**: 606. 1915. *C. straminea* of Gray's Man., ed. 7. *C. s.*, var. *tenera*, of Cayuga Fl.)

Damp grassland in fields and by roadsides, in rocky or stony, mostly sterile, and somewhat acid, soils; frequent. June.

Top of hill e. of Inlet s. of Lick Brook; South Hill (*D.!*); Six Mile Creek; n. end of Parkway, Cayuga Heights, abundant; near Esty Glen; Taughannock Point; s. w. of Waterburg; river thickets s. w. of Clyde; apparently absent in the McLean district and on the Ontario plain.

N. B. to B. C., southw. to N. J., Ky., Ark., and Calif.; occasional on the Atlantic Coastal Plain.

"Olney's *forma erecta* of this species," of the *Cayuga Flora*, may be *C. brevior*. Dudley's *C. straminea*, var. *festucacea* Carey, cannot be identified.

40a. **C. tenera** Dewey, var. **echinodes** (Fernald) Wiegand. (See Rhodora **26**: 2. 1924.)

Sandy woods; rare.

Farley Point, 1918 (*A. J. E. & A. Gershoy*).

Vt. to Mich., southw. to N. Y. and Iowa.

In addition to having the divaricate perigynia as described for var. *echinodes* in Gray's Man., ed. 7, this specimen and some others in the Gray Herbarium have distinctly larger perigynia.

41. **C. brevior** (Dewey) Mackenzie. (See Bul. Torr. Bot. Club **42**: 605. 1915. *C. festucacea*, var. *brevior* (Dewey) Fernald. *C. straminea* of Cayuga Fl.)

Grassy openings about woods and thickets, in sandy, gravelly, or somewhat heavier, sterile subacid soils; scarce. June.

Top of hill e. of Inlet, Newfield-Ithaca town line; South Hill (*D.!*); n. end of Parkway, Cayuga Heights; near Esty Glen; Taughannock Gorge (*D.!*); crests of Salmon Creek ravine s. of Genoa; Union Springs; Frontenac Island (*D.*); n. e. of Montezuma village; and elsewhere.

N. B. (?) and Me. to B. C., southw. to Fla. and Ark.; scarce on the Atlantic Coastal Plain.

Mackenzie's use of the names *C. straminea* and *C. brevior* seems sound, though the matter has not been critically reviewed.

42. **C. foenea** Willd. (*C. adusta* of Cayuga Fl.)

Dry open stony places and on ledges of sandstone, apparently in noncalcareous soils; rare. June.

Taft Hill (*D.*); hill 1½ miles n. of Caroline Center; Thatcher Pinnacles.

Me. to B. C., southw. to Md.; infrequent on the Atlantic Coastal Plain.

43. **C. alata** Torr.

Swales and marshes, in mucky soils; locally common. June 25–July 10.

Confined chiefly to the Ontario plain, and there probably influenced by the brackish conditions: Mud Pond, McLean Bogs; Salt Pond w. of Howland Island; Crusoe Prairie; Westbury Bog; Mud Pond, Conquest; Duck Lake; very common near Tyre; salt fields n. e. of Montezuma village; Montezuma Marshes (*D.*); Junius.

N. H. to Mich. and Fla., mostly along the coast.

Subgenus 3. *Eucarex*

44. **C. torta** Boott.

Close to rapidly running water in gravelly or stony soils along streams, and in other gravelly wet places in calcareous regions; frequent in nearly all the principal ravines. May.

E. Que. to Minn., southw. to N. C. and Mo.; rare or absent on the Coastal Plain.

45. **C. aquatilis** Wahl.

Marl meadows and marly swales; scarce. June–July 15.

Larch Meadow (*D.*); Dryden Lake (*D.* in C. U. Herb.); McLean Bogs (*D.*!); border of Chicago Bog; Lake Como (Locke Pond, *F. L. Kilborne* in C. U. Herb.); Union Springs (*D.*); Newton Ponds; marshes, Tyre; Miller Bog, Spring Lake.

Lab. to Alaska, southw. to D. C., Ind., Tex., and in the western mts. Found also in Eurasia.

This species differs from *C. stricta* in the stoloniferous habit, nonfibrous lower sheaths, glaucous color, smooth culms, and foliaceous lower bract which much overtops the staminate spike. All the specimens from this region have broader leaves, less firm lower sheaths, and paler scales, than material from Newfoundland and Canada, and are probably *C. substricta* Mackenzie. All the American material seen has acutely angled culms.

46. **C. stricta** Lam. (Including var. *angustata* (Boott) Bailey.) TUSSOCK SEDGE.

Low mucky meadows, swales, and the borders of marshes; common. June–July 15.

Newf. to Ont. and Nebr., southw. to Ga. and Tex., including the Coastal Plain.

This species is variable in length and width of spikes, in shape of perigynia, and in length, apex, and color of the scales. Some of these variations are apparently due to degree of maturity. The most extreme form has been separated as var. *curtissima*, but this does not appear to be uniform. So far, it has not been possible to correlate the central New York material with Mackenzie's treatment of the group (Bul. Torr. Bot. Club **42**: 405. 1915). The local forms of this species should receive further study.

46a. **C. stricta** Lam., var. **curtissima** Peck.

In situations similar to the preceding; scarce.

Springy places along Fall Creek near Roger Corner.

N. B. to Conn. and N. Y.

47. **C. crinita** Lam.

Wet places in various soils, principally along streams and shores; common. June.

Newf. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

47a. **C. crinita** Lam., var. **minor** Boott.

In situations similar to the preceding or somewhat drier; rare.

W. shore of pond at Mecklenburg, 1918 (*A. Gershoy*); specimen in C. U. Herb., doubtfully from Ithaca (*ex herb. T. J. Moon*). [This variety occurs near by in Cortland Co.]

Me. to N. Y., and perhaps elsewhere.

48. **C. gynandra** Schwein. (*C. crinita*, var. *gynandra*, of Gray's Man., ed. 7.)

Wet places, more commonly around bogs; infrequent. June 20–July 10.

S. e. corner of Newfield; between Slaterville and Dryden; Freeville Bog and Fir Tree Swamp, Freeville (*D.*!).

Newf. to Wis., southw. to Va., including the Coastal Plain, and in the mts. to Ga.

In central New York, *C. gynandra* appears to be distinct from *C. crinita*. If so considered, then *C. crinita*, var. *Porteri*, should probably be treated as a variety of *C. gynandra*. Weatherby (Rhodora **25**: 19. 1923) retains *C. gynandra* as a variety of *C. crinita*.

49. **C. polygama** Schk. (*C. Buxbaumii* of Cayuga Fl.)

Boggy meadows and springy places, in calcareous, often marly, soils; rare. June. Junius (*Sartwell*); Junius marl bogs (*D.*!).

Greenland (?) and Newf. to Alaska, southw. to Pa., the Great Lakes, Mo., Utah, and Calif., and in the mts. to N. C.; rare on the Atlantic Coastal Plain.

50. **C. paupercula** Michx. (*C. magellanica* of Cayuga Fl.)

Bogs, with some lime; rare. June 10–July 15.

Freeville Bog (*D.*!); Lowery Ponds; bog n. e. of Duck Lake; Westbury Bog.

Newf. to Lab. and B. C., southw. to Conn., Pa., and Utah; apparently absent in granitic N. E. and on the Atlantic Coastal Plain. Found also in Eurasia.

The var. irrigua (Wahl.) *Fernald is scarcely worthy of recognition.*

51. **C. limosa** L.

Peat bogs, in acid soil; scarce. June–July 10.

Freeville Bog (*D.*!); Malloryville Bog (*D.*!); Junius peat bogs (*D.*!); near Mud Pond, Conquest; Featherbed Bog.

Lab. and Newf. to Sask. and B. C., southw. to Pa., the Great Lakes, Colo., and Calif.; infrequent on the Atlantic Coastal Plain. Found also in Eu.

52. **C. prasina** Wahl. (*C. miliacea* of Cayuga Fl.)

Damp woods and glades, in alluvial or mucky, neutral or slightly calcareous, soils; frequent. May 20–June 20.

Common in Michigan Hollow Swamp; Larch Meadow; Slaterville Swamp; Ellis Hollow; Ringwood; and elsewhere.

W. Me. to Mich., southw. to Del., D. C., and Ohio, and along the mts. to Ga.; rare on the Coastal Plain.

53. **C. pallescens** L.

Damp fields and grassy banks, in sandy, gravelly, or loamy, mostly neutral, soils; locally common. June.

Widely distributed except on the more acid soils and the richer soils back from the shore of Cayuga Lake; rarely in "clay" as stated by Dudley.

Newf. to Wis., southw. to N. J., Pa., and Ill.; infrequent on the Coastal Plain. Found also in Eurasia.

The form with undulate sheaths (var. *undulata* Carey) occurs near Malloryville and Turkey Hill, according to Dudley.

54. **C. triceps** Michx., var. **hirsuta** (Willd.) Bailey. (*C. triceps* of Cayuga Fl.)

Damp or dry sandy, gravelly, or stony, neutral or somewhat acid, soils; scarce. June.

The narrows between Slaterville and Caroline Center; near South Hill Marsh (*D.*!); Bald Hill, Ithaca; near Bear Swamp (form, *D.*); Esty Glen; near Ludlowville (*H. B. Lord*); Utt Point.

Me. to s. Ont. and Mich., southw. to Fla. and Tex. Primarily a coastal plant, extending inland around the Great Lakes.

55. **C. virescens** Muhl. (*C. v.*, var. *elliptica*, of Cayuga Fl.)

Dry open woods and banks, in gravelly, somewhat calcareous, soils; scarce. June 15–July.

Near Summit Marsh (*D.*); Newfield Glen; Caroline hills; Six Mile Creek (*D.*!); McGowan Woods; near Etna (*D.*); Ringwood; Ovid (*D.*); Montezuma.

S. Me. to s. Ont., southw. to Ga. and Ky., except on the Coastal Plain.

56. **C. Swanii** (Fernald) Mackenzie. (*C. virescens* of Cayuga Fl.)

Damp grassy pastures, banks, and borders of woods, in gravelly neutral or slightly acid soils; frequent. June 15–July.

Enfield Glen (*D.*); near Danby (*D.*); the narrows between Slaterville and Caroline Center; South Hill Marsh; near Etna (*D.*); Freeville (*D.*!); near McLean Bogs; w. shore of Cayuga Lake, near Marions (*D.*).

N. S. to Mich., southw. to N. C., Tenn., and Mo., including the Coastal Plain.

57. **C. scabrata** Schwein.

Springy places in meadows and thickets, in mucky, more or less calcareous, soils; frequent. June 15–July.

Michigan Hollow; w. of Key Hill; n. w. of Enfield Falls; e. of West Danby; South Hill; n. of Buttermilk Glen; Coy Glen; Six Mile Creek; Ellis Hollow; s. w. of Ringwood; McLean Bogs; Beaver Brook; n. e. of Perry City; Paine Creek; and elsewhere.

E. Que. to Ont. and Mich., southw. to Pa. and Ohio, and in the mts. to S. C. and Tenn.; rare or absent on the Coastal Plain.

58. **C. pubescens** Muhl.

Alluvial thickets, in nonacid soils; frequent. June–July 15.

Enfield Glen (*D.*); Six Mile Creek (*D.*!); McGowan Woods (*D.*); Freeville (*D.*); Beaver Brook; region of McLean Bogs; Taughannock Gorge (*D.*!); Paine Creek (*D.*); and elsewhere.

N. S. to N. Dak., southw. to n. N. J., Ky., and Kans.; rare or absent on the Coastal Plain.

59. **C. pennsylvanica** Lam.

Dry banks and open woods, in sandy or gravelly acid soils; common. May 10–June 10.

On the light noncalcareous soils w., s., and s. e. of Ithaca, on the stony soils along the slopes of Cayuga Lake and on the ravine crests, and on the sandy soil n. of the lake; more local in the gravels of the McLean district; rare on the clays and richer soils back from the lake shores.

N. B. to Alberta, southw. to N. C. and Tenn.; common on the Coastal Plain.

60. **C. varia** Muhl. (*C. Emmonsii* of Cayuga Fl.)

In situations similar to the preceding, but in richer soil; frequent. May–June 20.

Foot of hill at Lick Brook; Cascadilla Creek; Fall Creek; Renwick slope; glen one mile s. of Willets; w. of Howland Island; and elsewhere.

N. S. to Ont. and Man., southw. to Ga. and Tex., including the Coastal Plain.

The form with dark scales (forma *colorata* (Bailey) Küken.) is occasional.

61. **C. communis** Bailey. (*C. pedicellata* Britton. *C. varia* of Cayuga Fl.)

Dry banks especially about the ravines, in gravelly and stony, rather rich, nonacid soils; common. May 15–June 15.

Generally distributed throughout the basin, except in the chestnut-vaccinium soils.

E. Que. to B. C., southw. to N. J., D. C., Ga., Okla., and Nebr.; rare or absent on the Atlantic Coastal Plain.

Variable in size and color of staminate spike.

62. **C. umbellata** Schk.

Dry sandy or gravelly sterile exposed hillsides, in neutral or acid soils; common. May; the earliest-fruiting species in this locality.

Top of hill, North Spencer; North Pinnacle, Caroline; Buttermilk Glen; Fall Creek Drive, Ithaca; Renwick slope; and elsewhere.

P. E. I. and Me. to B. C., southw. to N. J., D. C., and Okla., including the Atlantic Coastal Plain.

A form is frequent with the culms 6–16 cm. high and with 1–2 pistillate spikes at the base of the staminate spike (forma *vicina* (Dewey) Wiegand, see Rhodora **26**:2. 1924): West Danby to Newfield; Enfield Glen; North Pinnacle, Caroline; Cascadilla woods; Fall Creek; Renwick slope; Taughannock Gorge. Occasional plants occur with glabrous perigynia but otherwise like the typical form and not the var. *tonsa* Fernald, which according to Mackenzie has stiff, broad leaves.

62a. **C. umbellata** Schk., var. **brevirostris** Boott.

In situations similar to the preceding, or more exposed; frequent.

North Pinnacle, Caroline; near Enfield Glen; Buttermilk Glen; South Hill; Renwick slope; Esty Glen.

Newf. to Sask. and B. C., southw. to n. N. E., N. Y., N. Mex., and Calif., including the northern Atlantic Coastal Plain.

63. **C. longirostris** Torr.

Rich soil on the borders of woods; rare. May 20–June 10.

Inlet Valley, n. corner of Lick Brook cove at base of hill (*G. T. Hastings*!); Salt Creek Marsh, Montezuma, 1886 (*B. G. Cole* in C. U. Herb.).

N. B. to Sask., southw. to n. N. J., Pa., and Nebr.; local; not coastal.

64. **C. Willdenowii** Schk.

Dry ravine banks and open hillside woods, in stony, nearly neutral, soils; frequent. June 15–30.

South Hill (*D.* in C. U. Herb.); s. side of Amphitheater, Six Mile Creek; Cascadilla woods; Renwick slope; crest of glen one mile s. of Willets; and elsewhere.

Mass. to Man., southw. to Fla., Ky., and Tex.; rare or absent on the Coastal Plain.

65. **C. Jamesii** Schwein. (*C. Steudelii* of Cayuga Fl.)

Wooded hillsides, in very rich gravelly subneutral soils; rare. June.

Base of hill s. of Lick Brook; s. w. side of Amphitheater, Six Mile Creek (*D.*!).

N. Y. and Ont. to Mich. and Iowa, southw. to W. Va., Mo., and Kans. A plant of the rich soils of the interior.

66. **C. pedunculata** Muhl.

Dry or damp rich woodlands, in humus on gravelly, more or less calcareous, soils; not uncommon. May 15–30.

Rare or absent on the more residual chestnut soils of the basin, on the ravine crests and stony lake slopes, and on the clays.

Newf. to Sask., southw. to Va., Ohio, Mich., and Iowa; rare or absent on the Coastal Plain.

67. **C. plantaginea** Lam.

Dry rich wooded slopes, in humus on gravelly, more or less calcareous, soils; frequent. May 10–30.

In most of the larger ravines of the basin, and in rich woodlands.

N. B. to Man., southw. to N. C., Ind., and Ill.; rare or absent on the Coastal Plain.

68. **C. Careyana** Torr.

Woodlands, in very rich dark soils over gravel: scarce. May 20–June 15.

Ravine n. of Buttermilk Glen (*D.*); Beech Woods, Six Mile Creek; Woodwardia woods (*D.*); Salmon Creek valley two miles n. of Ludlowville; Little Salmon Creek; Wood Mill station, with Jeffersonia (*D.*!); Taughannock Gorge? (*D.*). The type specimens were found near Auburn, N. Y., by John Carey in 1832.

N. Y. and Ont. to Mich., southw. to Va. and Mo.; local; rare or absent on the Coastal Plain.

69. **C. platyphylla** Carey.

Dry wooded slopes and banks, in gravelly calcareous soils; not uncommon. June 1–15.

In most of the ravines of the basin, and in other localities in the proper soils.

Que. (?) and s. Me. to Mich., southw. to Va. and Ill.; rare or absent on the Coastal Plain.

Dudley recognized an unnamed variety of this species, but it seems impossible to retain this as distinct from the typical form.

70. **C. laxiculmis** Schwein. (*C. retrocurva* of Cayuga Fl.)

Rich wooded slopes, in humus on gravelly, slightly calcareous soils; locally abundant. June.

Michigan Hollow; Fir Tree Swamp, Danby; Beech Woods, Six Mile Creek; South Hill; woods around McLean Bogs; Taughannock Gorge (*D.*); Ludlowville; Paine Creek glen (*D.*!); absent on the acid chestnut soils and on the clays.

S. Me. to Mich., southw. to Va. and Mo.; a few records on the Coastal Plain.

71. **C. digitalis** Willd.

Wooded slopes, in humus on clay-gravel or stony neutral soils; locally common. June.

Woods near Michigan Hollow Swamp; Inlet Valley, s. of mouth of Enfield Glen; Six Mile Creek; Cascadilla woods; Fall Creek Gorge; Cornell Heights; Renwick slope; Esty Glen; glen one mile s. of Willets; Howland Island; and elsewhere.

Me. to Minn., southw. to Fla. and Tex.; rare or absent on the Coastal Plain.

This species differs from *C. laxiculmis* in the narrower green leaves, in the smaller perigynia (2.5–2.8 mm. long instead of 3–4 mm. long), and in the absence of the one or two sterile flowers at the base of the pistillate spikes. The upper bracts usually exceed the staminate spikes. Intermediate forms between these species are occasional (var. *copulata* Bailey), combining various characters of the two plants. They strongly suggest a hybrid origin.

72. **C. Hitchcockiana** Dewey.

Rich woods, in deep black soil and humus on a gravelly nonacid subtratum; frequent. June 15–30.

S. of Danby village (*D.*); foot of hill, Inlet Valley, Ithaca-Newfield town line; n. of Lick Brook; Beech Woods, Six Mile Creek; n. of Forest Home (*D.*); "Franklin's ravine and 'Camp Warwick'" (*D.*); alluvial woods along creek n. of Mecklenburg; between Jacksonville and Waterburg; Ovid Woods (*D.*); Little

Salmon Creek valley; Paine Creek glen; Wood Mill station (*D.*); Big Gully; woods e. of Turtle Pond.

Vt. to Mich., southw. to Ky. and Mo. A plant primarily of the rich soils of the Ohio Valley.

73. **C. oligocarpa** Schk.

Dry or damp, probably calcareous, shale and talus in ravines; rare. May 25–June.

Shaly bank of Six Mile Creek below Green Tree (Potter) Falls, first collected by O. E. Pearce, 1884 (*D.*); rich steep wooded slopes, Paine Creek glen; Big Gully.

Vt. to Ont. and Iowa, southw. to W. Va., Ky., and Okla. A plant of the richer soils of the interior.

74. **C. albursina** Sheldon. (See Rhodora **24**: 189. 1922. *C. laxiflora*, var. *latifolia*, of Gray's Man., ed. 7, and of Cayuga Fl.)

Rich woodlands and banks, on a gravelly or loamy, more or less calcareous, substratum; frequent. May 20–June.

Near Michigan Hollow Swamp; Jennings Pond; foot of hill, Lick Brook; Enfield Glen (*D.*); Six Mile Creek; woods near Freeville (*D.*); woods around McLean Bogs (*D.*); ravine near Elm Beach, Romulus; and elsewhere.

W. Que. and Vt. to Minn., southw. to Va., Tenn., Mo., and Iowa. A plant of the rich soils of the interior.

75. **C. blanda** Dewey. (See Rhodora **24**: 189. 1922. Including *C. laxiflora*, vars. *blanda* and *varians*, of Gray's Man., ed. 7. *C. l.*, var. *blanda*, of Cayuga Fl.)

Roadsides, banks, thickets, and cliffs, in gravel or clay-gravel, in neutral or slightly calcareous soils; frequent. May 20–June.

Inlet Valley, s. of Enfield Creek; Coy Glen; s. of Mecklenburg; Six Mile Creek; Ithaca flats; Fall Creek; McGowan Woods; McLean Woods; Cayuga Heights; s. of Ludlowville; Salmon Creek; glen s. of Willets; Paine Creek glen; Big Gully; Black Brook, Tyre; and elsewhere.

Vt. and e. Mass. to Minn., southw. to D. C., Ky., La., Tex., and Nebr., and in the mts. to Ala.; infrequent or rare on the Coastal Plain.

76. **C. laxiflora** Lam. (*C. laxiflora*, var. *gracillima*, of Gray's Man., ed. 7. *C. laxiflora*, in part at least, of Cayuga Fl.)

Low woods and damp cliffs; infrequent. June 1–July 1.

Woodland swale n. w. of South Hill Marsh and slope n.; various places along Six Mile Creek; near Mud Pond, McLean Bogs; roadside between Willets and Paine Creek; Union Springs.

E. Mass. and R. I. to Wis., southw. to N. Y. and Ill., and in the mts. to Va.

77. **C. anceps** Muhl. (See Rhodora **24**: 189. 1922. *C. laxiflora*, var. *plantaginea*, of Cayuga Fl., and var. *patulifolia* of authors.)

Wooded slopes, in rich humus on gravelly or loamy nonacid soils; frequent. May 20–June.

Top of hill e. of Inlet, Newfield; Inlet Valley, at foot of hill s. of Lick Brook; Six Mile Creek; Cascadilla woods (*D.*); Fall Creek (*D.*!); McGowan Woods (*D.*); woods about Mud Creek, Freeville; Renwick slope; near Esty Glen; Salmon Creek; Wood Mill; Black Brook, Tyre; Howland Island; Spring Lake.

S. Me. to Wis., southw. to N. C., Tenn., and Ill.; not typically a plant of the Coastal Plain.

78. **C. leptonervia** Fernald. (See Rhodora **24**: 189. 1922. *C. laxiflora*, var. *varians* Bailey, not Gray's Man. *C. l.*, var. *intermedia*, probably, of Cayuga Fl.)

Moist woodlands, in rich humus or peaty soils; frequent. May 20–June.

Thatcher Pinnacles; Michigan Hollow Swamp; White Church; Six Mile Creek; Beebe Lake; swamp e. of Slaterville; Freeville Bog; McLean Bogs; Beaver Brook; Black Brook, Tyre; Howland Island; s. w. of Duck Lake.

Lab. and Newf. to Minn., southw. to Conn., N. Y., and Mich., and in the mts. to N. C.

Leaves more fluted than in *C. anceps.*

79. **C. aurea** Nutt.

Wet gravelly banks and shores and on ledges, in marly or at least strongly calcareous soils; frequent. June–July.

Inlet Valley, s. of Enfield Creek; railroad s. of Buttermilk Creek; Six Mile Creek (*D.*!); Cascadilla Glen (*D.*); Freeville and the McLean region; Taughannock Gorge; Paine Creek; Junius marl ponds; n. of Spring Lake; Westbury Bog; and elsewhere.

Newf. to B. C., southw. to n. Conn., Pa., Ind., Wis., Utah, and Calif.; rare or absent on the Atlantic Coastal Plain.

80. **C. Woodii** Dewey. (*C. colorata* Mackenzie, Bul. Torr. Bot. Club **37**: 232. 1910. *C. tetanica* of Cayuga Fl., in part.)

Moist woodlands, usually in very rich soil and humus; infrequent. May 15–June 20.

Beech Woods, Six Mile Creek (*D.* in C. U. Herb.!); Cascadilla woods (*D.*); bank at Wood Mill station, with Jeffersonia (*D.*!); Salmon Creek, n. of Ludlowville.

N. Y. and Ont. to Mich. and Man.

Mackenzie has stated in correspondence that *C. Woodii* Dewey is an earlier name for his *C. colorata.*

81. **C. tetanica** Schk.

Marl springs and meadows; scarce. June 10–30.

Spring, Inlet Valley s. of Enfield Creek; Junius marl ponds (*D.*!); prairie n. of Crusoe Lake. Dudley gives some other stations, but whether these refer to this species or to *C. Woodii* is uncertain.

Mass. to Man., southw. to D. C. and Mo.; rare on the Coastal Plain.

The differences between *C. tetanica* and *C. Woodii* are fairly constant, but they are almost entirely in connection with the lower part of the plant, and might be suspected to be due to the radically different type of soil which each inhabits although this does not seem to be the case. Without structural characters in the inflorescence, the separation of these two species by the characters given is not very secure.

82. **C. granularis** Muhl.

Grassy meadows and wet places, in rich, mostly clay, soils; frequent. June.

Summit Marsh; Ellis Hollow; Shurger Glen; gravelly beach, Big Gully Point; Union Springs; rich woods opposite Turtle Pond; s. w. of Duck Lake; n. e. of Montezuma village.

N. B.(?) and Vt. to Man., southw. to Fla. and La.; occasional on the Coastal Plain.

82a. **C. granularis** Muhl., var. **Haleana** (Olney) Porter. (*C. g.*, var. *recta*, of Cayuga Fl.)

In situations similar to the preceding, or often more marly; common. June.

Enfield Glen; West Hill; Buttermilk Glen; Six Mile Creek; Freeville Bog; region of McLean Bogs; Willets; Big Gully Point; Union Springs; Montezuma; marly moor, Junius marl ponds; and elsewhere.

Me. to Sask., southw. to Va., Ohio, Mich., and Wis.; rare or absent on the Coastal Plain.

83. **C. grisea** Wahl.

Damp woodlands and banks, in rich sandy, gravelly, or alluvial, neutral or calcareous, soils; frequent. May 25–June.

Frequent at base of hills in the Inlet Valley, along the shores of Cayuga Lake to Union Springs, on the Clyde River flats, and elsewhere; occasionally found toward Dryden and McLean.

S. Me. to Minn., southw. to N. C. and Ark.; infrequent or rare on the Coastal Plain.

Variable in plumpness of perigynium and in breadth of leaf, approaching var. *rigida* Bailey or var. *angustifolia* Boott in shady places. In the Cayuga Lake Basin, at least, these variations are apparently ecological.

84. **C. glaucodea** Tuckerm.

Damp sandy or gravelly acid soils: rare. June.

Dry water-holes and grassland about South Hill Marsh, with *Lyonia ligustrina* and *Prunus susquehanae*, where it is a member of the very interesting colony of rare plants found there; also on the n. e. slope of South Hill.

E. Mass. and Vt. to Va., and westw. along the Great Lakes to Ill. and Ark.; frequent on the coastal plain of N. J.

85. **C. eburnea** Boott.

Dry or damp ledges and banks, in calcareous soils along ravines, and in marly places; frequent. May 15–June 20.

Lower Enfield Glen; n. of Lick Brook; Six Mile Creek; Cascadilla Creek (*D.*); near Triphammer Falls (*D.*!); Salmon Creek; Taughannock Gorge; glen one mile s. of Willets; King Ferry.

Newf. to Mackenzie, southw. to Va., Ky., Mo., and Nebr.; rare or absent on the Coastal Plain.

86. **C. capillaris** L. (Including var. *elongata* Olney)

Mossy and gravelly calcareous shores and springs; very rare.

"On half-submerged logs west side of the principal 'Marl Pond,' South Cortland, 1884" (*D.*). [Otter Creek Springs, Cortland, 1869, *S. N. Cowles*.!] As late as 1896 there were a number of clumps on decaying logs in Otter Spring. Since then improvements about Otter Spring, from which the city of Cortland derives its water supply, have probably exterminated this rare plant, not elsewhere reported in N. Y. State. It seems to have disappeared also from the marl-pond station.

Newf. to Alaska, southw. to s. N. B., Me. (?), N. Y., Mich., and in the mts. to Colo. and Utah. Found also in Eurasia.

87. **C. arctata** Boott.

Rich woods and copses, in gravelly calcareous soils; infrequent. May 20–June.

Near Dry Run Valley and Signer Woods, Spencer; around Michigan Hollow Swamp; low woods e. of Slaterville; near Willow Glen; Freeville (*D.* in C. U. Herb.); woods around McLean Bogs; and elsewhere.

Newf. to Ont., southw. to Pa., Mich., and Minn.; rare or absent on the Coastal Plain.

88. **C. debilis** Michx., var. **Rudgei** Bailey. (*C. debilis*, nos. 1132 and 1133, of Cayuga Fl.)

Dry or damp gravelly woodlands and thickets, in neutral or calcareous soils; scarce. June.

Caroline; Turkey Hill; meadow s. e. of Etna (*D.*); near Freeville Bog (*D.*!); Lake Como; "Marl Cr., Marl Pond woods" (*D.*); Dryden-Lansing Swamp (*D.*); Bear Swamp (*D.*).

Newf. to Wis., southw. to N. C.

This plant, so common on the Coastal Plain from Mass. to N. J., grows there in sandy acid soils, while here it is found mostly in calcareous soils. Two separate plants may be involved. *Dudley has recognized two varieties, which cannot now be distinguished.*

89. **C. aestivalis** M. A. Curtis.

Steep wooded banks near rocks, in soil of mixed sand and clay; very rare. June.

High bank of creek, in the narrows between Slaterville and Caroline Center (*K. M. W., A. J. E., & L. F. Randolph*). Reported from only two or three other places in N. Y. State.

N. H. to Ga.; generally rare. A plant of the Allegheny Mts.

90. **C. gracillima** Schwein.

Damp grassy meadows and open woods, in gravelly neutral or subacid soils: common, and widely distributed. June.

Newf. to Man., southw. to N. C., Ohio, and Mich.; infrequent on the Coastal Plain.

91. **C. Oederi** Retz., var. **pumila** (Cos. & Germ.) Fernald. (*C. viridula* Michx. *C. Oederi, nos. 1136 and 1137, of Cayuga Fl.*)

Gravelly calcareous shores and in marl; scarce. June–Sept.

Spencer Lake; Cortland marl pond region (*D.*!); Myers Point; Ludlowville, below the spring; Utt Point (*D.*!); Farley Point (*D.*!); quarry s. of Union Springs (*D.*); Big Gully Point.

Newf. to B. C., southw. to N. E., Pa., Ohio, Ind., Utah, and Wash.

92. **C. flava** L.

Springy places and meadows, in marly soil; common. June–July 15.

Characteristic of nearly all wet places where marl is found. "The form, '*var. androgyna*,' Olney, is at Summit Marsh, Locke Pond, the Marl Ponds, and at the mouth of Paine's Cr. Some of the Locke Pond specimens possess compound pistillate spikes" (*D.*).

Newf. to Alberta and B. C. (?), southw. to Conn., n. N. J., Pa., Mich., and Mont.; rare or absent on the Atlantic Coastal Plain. Found also in Eu.

93. **C. cryptolepis** Mackenzie. (See Torreya **14**:155. 1914. *C. flava L.*, var. *recti-rostra* Gaudin.)

In situations similar to the preceding; rare.

Summit Marsh; moor of Newton Ponds.

Newf. to R. I. and Mich. Found also in Eu.

More or less transitional to *C. Oederi*. Its status as a species is somewhat doubtful.

94. **C. lasiocarpa** Ehrh. (See Kükenthal in *Das Pflanzenreich*, pt. 4, sect. 20, p. 747. 1909. *C. filiformis* of Gray's Man., ed. 7, and of Cayuga Fl.)

Marl bogs, often in very wet places; frequent in such localities. June 10–July 10.

Summit Marsh; s. of Michigan Hollow Swamp; Fleming Meadow; Beaver Brook; Junius marl ponds; Westbury Prairie; Stark Pond; Spring Lake.

Newf. to B. C., southw. to n. N. J., Pa., Iowa, and Minn.; rare or absent on the Atlantic Coastal Plain. Found also in Eu.

95. **C. lanuginosa** Michx. (*C. filiformis*, var. *latifolia*, of Cayuga Fl.)

Boggy, more or less calcareous, meadows and ditches, and on gravelly calcareous shores; frequent. June–July 15.

One mile above Enfield Falls; Freeville Bog; Mud Creek, Freeville; McLean Bogs; Malloryville; swale s. e. of McLean; by railroad one mile s. of Aurora; Farley Point (*D.*!); n. of Union Springs (*D.*); moor of Newton Ponds; prairie n. of Crusoe Lake.

N. B. to Sask. and B. C., southw. to Pa., Ill., Kans., N. Mex., and Calif.; apparently frequent on some parts of the Atlantic Coastal Plain.

96. **C. HIRTA** L.

Gravelly and stony soils, in railroad ballast; very rare.

D., L. & W. R. R. roadbed on South Hill w. of Aurora St., "detected 1882, but may have been growing there for ten years" (*D.*); same station, 1894–1900 (*K. M. W.*); Ithaca, 1868 (*H. B. Lord* in C. U. Herb.).

E. Mass. to cent. N. Y. and Pa.; local. Adventive from Eu.

97. **C. trichocarpa** Muhl.

Swales and marshes, mostly in alluvial calcareous soils; frequent. June–July 10.

Inlet, between Newfield and Enfield Creeks and near Ithaca; near Renwick; Beebe Lake (*D.*); n. of Freeville (*D.*); Ludlowville (*D.*); Myers Point; and elsewhere; often in large colonies.

Que. and Vt. to Ont., southw. to Ga. and Mo.; not coastal.

98. **C. riparia** Curt., var. **lacustris** (Willd.) Küken. (See Kükenthal in *Das Pflanzenreich*, pt. 4, sect. 20, p. 736. 1909. *C. riparia* of Cayuga Fl. *C. lacustris* of Britton & Brown's Ill. Fl.)

Swales and marshes, in mucky neutral or usually slightly calcareous soils; infrequent. June–July 10.

Michigan Hollow Swamp; Inlet Valley, s. of Enfield Creek; Larch Meadow; Cayuta Lake; Indian Spring marsh; Ellis Hollow Swamp; Beaver Brook; McLean Bogs; Miller Bog, Spring Lake; arbor vitae swamp e. of Clyde.

Newf. to Man. and Idaho, southw. to Fla., La., and Tex.; infrequent and local on the Coastal Plain. Found also in Eu.

99. **C. vesicaria** L., var. **monile** (Tuckerm.) Fernald. (*C. monile*, and probably also *C. ampullacea*, of Cayuga Fl.)

Swales and pools, in mucky soil over calcareous gravels; scarce. June–July.

Slaterville Swamp; near Freeville station; Woodwardia Bog to Mud Creek, Freeville; Cortland marl ponds and Chicago Bog region; Lake Como (Locke Pond, *D.*); road southw. from Pout Pond (*D.*).

Newf. to Sask., southw. to Conn., N. Y., Ky., and Mo.; infrequent on the Coastal Plain.

100. **C. Tuckermani** Dewey.

Exsiccated ditches and swales, in more or less calcareous soils; scarce. June 15–July.

Headwaters Swamp (*C. P. Smith*); Slaterville Swamp; marly pond w. of Cayuta Lake; West Hill, Ithaca (*Smith*); Ithaca flats; Fall Creek, n. e. of Varna; Ringwood Hollow; Fir Tree Swamp, Freeville; near Ludlowville (*H. B. Lord*); Clyde River flats, s. w. of Clyde.

N. B. to Que., Ont., and Minn., southw. to n. N. J., Ind., and Iowa; rare or absent on the Coastal Plain.

All specimens except those from Headwaters Swamp and Fir Tree Swamp agree well with Smith's var. *niagarensis* (see Rhodora 17: 57. 1915), but a study of this variety in the larger herbaria has failed to support its validity.

101. **C. retrorsa** Schwein.

Swales, in gravelly alluvial, more or less calcareous, soils; frequent. June 15–July.

Renwick woods; w. of Jacksonville; Taughannock Point; roadside w. of Willets; Big Gully Point; and elsewhere.

E. Que. to Sask. and B. C., southw. to Conn., Pa., the Great Lakes, Iowa, Idaho, and Oreg.; rare or absent on the Atlantic Coastal Plain.

101a. **C. retrorsa** Schwein., var. **Bradleyi** (Dewey) Farwell. (See Rhodora 23:87. 1921. *C. r.*, var. *Hartii*, of Gray's Man., ed. 7, and of Cayuga Fl.)

In situations similar to the preceding; scarce.

Inlet Marshes (*D.*); Ellis Hollow Swamp (*D.*); Ludlowville (*H. B. Lord*).

N. H. to Ont. and Mich.

102. **C. rostrata** Stokes. (*C. utriculata,* second form and var. *minor,* of Cayuga Fl.)

Boggy meadows and swales, in neutral or possibly more or less calcareous regions; frequent. June 15–July.

"The common form, occurring in the larger marshes and along our ponds and lakes . . . . ." (*D.*); sphagnum meadows along creek above Enfield Falls; Slaterville Swamp; Freeville; McLean Bogs (*D.*); Chicago Bog; Ludlowville; Canoga Marshes (*D.*); Lake Como.

Newf. and Lab. to Sask. and B. C., southw. to Conn., N. Y., Ill., Utah, and Calif.; rare on the Atlantic Coastal Plain.

102a. **C. rostrata** Stokes, var. **utriculata** (Boott) Bailey. (*C. utriculata,* first form, of Cayuga Fl.)

In situations and soils similar to the preceding; scarce.

Summit Marsh (*D.!*); Inlet Marshes (*D.*); Michigan Hollow Swamp (*D.*).

Range nearly as in typical form, but extending southw. to N. J. and Ohio.

103. **C. folliculata** L.

Boggy thickets, in sandy or gravelly, poorly drained, neutral or acid soils; scarce. June–Aug.

South Hill Marsh (*D.!*); n. of Forest Home, in woods (*D.*); n. of Etna (*D.*); Freeville, in Fir Tree Swamp (*D.*) and Freeville Bog (*D.!*); Beaver Brook swamp (*D.*); absent from the more limy soils and from the richer soils.

Newf. to Ont. and Mich., southw. to S. C. and W. Va., locally abundant. A plant primarily of the Coastal Plain.

104. **C. Pseudo-Cyperus** L.

On hummocks and logs, in shallow boggy waters about peat bogs; rare. June–July.

Spencer Lake, 1924; Lake Como (Locke Pond, *D.*); n. of Cayuga (*B. G. Cole*); Junius peat bogs.

Newf. to Sask., southw. to Conn., cent. N. Y., and the Great Lakes; rare or absent on the Coastal Plain.

105. **C. comosa** Boott.

Swales and marshes, in boggy, more or less acid, soils; frequent. June 20–July.

Spencer Lake; Michigan Hollow Swamp; Enfield Valley, above the Falls; Cayuta Lake (*D.!*); Renwick marsh; Freeville Bog; Dryden Lake; McLean Bogs; Vandemark Pond; Miller Bog, Spring Lake; Mud Pond, Conquest; Clyde River flats.

N. S. to Wash., southw. to Fla., La., and s. Calif., including the Atlantic Coastal Plain.

Apparent hybrids with *C. hystericina* occur at Junius on the marly moor of Vandemark and Newton Ponds (*A. J. E. & L. H. MacDaniels*), and at Pout Pond (*D.*). In all cases the achenes are undeveloped. A hybrid with *C. lurida* was reported from West Danby by Dudley.

106. **C. hystericina** Muhl.

Springy spots and meadows, in rich mucky or boggy, more or less calcareous, soils; frequent. June 10–July 15.

Creek above Enfield Falls; hillside, Coy Glen; crest of West Hill; s. w. corner of Cayuga Lake; Renwick marsh; McGowan Woods; Freeville Bog; Beaver Brook; Taughannock Point; marly hillside, Salmon Creek e. of Lansingville; bottom land in Paine Creek; and elsewhere.

Newf. to Alberta, southw. to Ga., N. Mex., and Ariz.; infrequent on the Coastal Plain.

If the spikes exceed 3.5 cm. in length, the plant is forma *Dudleyi* (Bailey) Wiegand. (See Rhodora **26**:2. 1924. *C. hystericina*, var. *Dudleyi* Bailey; var. *Cooleyi*, Gray's Man., ed. 7, not Dewey. *C. Pseudo-Cyperus* × *C. hystricina*?, Dudley in Cayuga Fl.) Such forms have been found in considerable abundance near Indian Spring.

107. **C. Schweinitzii** Dewey.

Swamps, in calcareous regions; rare. June.

Spencer Lake and swamp n.; boggy woodlands along Beaver Brook (*K. M. W. & A. R. Bechtel*).

Vt. and Ont. to Mich., southw. to Conn., n. N. J., and Mo. (?); probably absent on the Coastal Plain.

108. **C. lurida** Wahl. (*C. tentaculata* of Cayuga Fl.)

Low grounds, in various soils if not strongly calcareous, often in alluvium or clay; common. July–Aug.

N. S. to Minn., southw. to Fla., Nebr., and Tex.; common on the Coastal Plain.

Hybrids with *C. lupulina* were found west of Howland Island.

109. **C. lupulina** Muhl.

Low grounds, in alluvial or mucky soils, often in clay, in both calcareous and non-calcareous regions; common, and widely distributed. June 20–Aug.

N. B. and N. S. to Hudson Bay, southw. to Fla. and Tex., including the Coastal Plain.

109a. **C. lupulina** Muhl., var. **pedunculata** Dewey.

In situations similar to the preceding; equally common.

Range nearly the same as that of the typical form.

Abundant transitions occur between this and the typical form. Dudley discusses other forms, also a hybrid of *C. lupulina* and *C. retrorsa* (*C. lupulina*, var. *gigantoides* Dewey, described from specimens collected at Myers Point by H. B. Lord in 1865) found at Myers Point, on the Inlet Marshes between the salt works and Willow Ave., n. of Freeville, and near Taughannock station (Lansing).

110. **C. intumescens** Rudge.

Swales and the borders of swamps, in sandy or gravelly, more or less acid (rarely calcareous?), soils; scarce. June–July.

S. of Summit Marsh; Michigan Hollow; South Hill Marsh (*D.*!); Mud Creek, Freeville; Waterloo; Montezuma; Duck Lake.

Newf. to Mass., N. Y., and Ind., southw. to Fla. and La. A plant chiefly of the Coastal Plain.

110a. **C. intumescens** Rudge, var. **Fernaldii** Bailey.

In mucky or boggy soils, probably heavier or more calcareous than those in which the typical form of the species is found; common. June–July.

Michigan Hollow Swamp; Newfield; above Enfield Falls; Renwick woods; Fall Creek, e. of Varna; Slaterville Swamp; Mud Creek, Freeville; Beaver Brook; n. e. of Hanshaw Corners; Townley Swamp; w. of Howland Island.

Newf. to Man., southw. to Mass., N. Y., Mich., and Wis., and in the mts. to N. C.; more inland and more northern than the typical form.

11f. **C. Grayii** Carey.

Alluvial woods and meadows; scarce. June 20–Aug.

Renwick woods; Freeville, s. of Fir Tree Swamp (*D.*); Big Gully Point; Utt Point; roadside ditch w. of Howland Island; two miles n. of Montezuma; Galen, abundant on the Clyde River flats.

Vt. to Mich., southw. to Ga. and Mo.; absent on the Coastal Plain. A plant of the richer soils of the interior.

20. ARACEAE (ARUM FAMILY)

a. Spadix subtended by a spathe; leaves broad.
  b. Spathe enveloping the spadix.
    c. Spadix elongated; perianth wanting; plant monoecious or dioecious.
      d. Upper part of the spadix not flower-bearing, smooth; leaves deeply divided or compound. 1. ARISAEMA
      d. Upper part of the spadix, as well as the lower part, flower-bearing; leaves simple, sagittate. 2. PELTANDRA
    c. Spadix globular; perianth present; plant with perfect flowers. 3. SYMPLOCARPUS
  b. Spathe flat, divaricate or reflexed; flowers perfect, without perianth. 4. CALLA
a. Spadix naked, without an obvious spathe, cylindrical; flowers perfect, with perianth; leaves linear. 5. ACORUS

1. **Arisaema** Mart.

a. Leaves 3-foliolate, not pedate; spathe hooded, the hood 2–5 cm. wide, short-acuminate; spadix blunt.
  b. Tube of the spathe not fluted, usually indistinctly striped; margins of tube at summit contiguous, often overlapping, conspicuously flaring; leaves glaucous beneath. 1. *A. triphyllum*
  b. Tube of the spathe fluted, green-and-white striped; margins of tube at summit with a more V-shaped opening between them, less flaring; leaves green beneath. 1a. *A. t.*, var. *Stewardsonii*
a. Leaves pedately 7–11-foliolate; spathe straight, narrow; spadix ending in a very long caudate tip. 2. *A. Dracontium*

1. **A. triphyllum** (L.) Schott. INDIAN TURNIP. JACK-IN-THE-PULPIT.

Woodlands, in damp rich mucky soil and humus; frequent in ravines and in the vicinity of swamps, but generally absent from boggy places. May.

N. S. to Minn., southw. to Fla., La., and Kans., including the Coastal Plain.

It has not been possible to separate *A. pusillum* (Peck) Nash in this region from this species by any constant characters.

1a. **A. triphyllum** (L.) Schott, var. **Stewardsonii** (Britton) G. T. Stevens. (See Britton & Brown, Ill. Fl., ed. 2, 1:443. 1913. Rhodora 23:136. 1921. *A Stewardsonii* Britton.)

Mossy and boggy swamps, in calcareous regions, rarely in somewhat drier situations; frequent. May.

Headwaters Swamp; Michigan Hollow Swamp; between Slaterville and Dryden Lake; Renwick woods; Ellis Hollow Swamp; Ringwood; McLean Bogs; Howland Island; Montezuma flats; Clyde River flats.

N. S. to N. J. and Pa.; probably rare or absent on the Coastal Plain.

Generally in this region *A. Stewardsonii* is distinct from *A. triphyllum*, having the characters given in the key and inhabiting boggy soils; but occasional plants are found in less boggy places, and these often combine in different ways the characters

of the two species. In the low woods along the Clyde River southwest of Clyde, many plants were found with glaucous leaves but with strongly fluted spathes the edges of which were not conspicuously spreading at the summit. Two such plants were found in dry sandy soil. With so many transitional forms occurring, it is probably best to treat the plant as a variety of *A. triphyllum*.

2. **A. Dracontium** (L.) Schott. GREEN DRAGON.

Banks and thickets, in low, very rich, black alluvial soil; scarce. May 20–June 20.
Inlet, near Lick Brook and at the mouth of Enfield Creek; "woods beyond Larch Meadow" (*D.*); Negundo Woods (*D.*!); Renwick woods (*D.*!); Forest Home, island; Cortland marl ponds; field near mouth of Paine Creek (*D.*); Lockwood Flats (*J. J. Thomas*); Utt Point; Big Gully Point; Montezuma flats.
N. E. to Minn., southw. to Fla., Kans., and Tex.; rare on the Coastal Plain. A plant of the rich soils of the interior.

2. Peltandra Raf.

1. **P. virginica** (L.) Kunth. (*P. undulata* of Cayuga Fl.) ARROW ARUM.

Shallow water, in rich alluvial and mucky neutral or acid marshes and the borders of swamps; locally common. June–July.
Inlet Marshes (*D.*!); points and bays along Cayuga Lake shore; Lake Como; Cayuga Marshes (*D.*!); and elsewhere.
S. Me. to Ont. and Mich., southw. to Fla., La., and Mo., including the Coastal Plain.

3. Symplocarpus Salisb.

1. **S. foetidus** (L.) Nutt. SKUNK CABBAGE.

Rich alluvial bottom-land woods and mucky swamps; common, and generally distributed. Feb. 25–Apr.
N. S. to Minn., southw. to N. C., (Fla., *Small*), and Iowa; less common on the Coastal Plain.

4. Calla L.

1. **C. palustris** L. WILD CALLA.

Wooded belts around acid peat bogs and boggy places, in soft muck and shallow water; infrequent. May–June.
Michigan Hollow Swamp (*D.*!); West Danby; w. of the Inlet (*D.*); Dryden-Lansing Swamp (*D.*); Freeville (*D.*); McLean Bogs; along railroad at Chicago Crossing; Lake Como; Pout Pond; Mud Pond and Duck Lake, Conquest.
N. S. to Hudson Bay and Minn., southw. to n. N. J., Pa., Wis., and Iowa; rare or absent on the Coastal Plain. Found also in Eurasia.

5. Acorus L.

1. **A. Calamus** L. SWEET FLAG.

Springy meadows and borders of marshes, in rich wet, but not strongly calcareous, soils; common, and widely distributed. June.
N. S. to Ont. and Minn., southw. to Fla. and Tex., including the Coastal Plain. Found also in Eurâsia.

21. LEMNACEAE (DUCKWEED FAMILY)

a. Fronds with rootlets, flat, often branched.
  b. Rootlets several to each frond; fronds 5–15-nerved, purple beneath. 1. SPIRODELA
  b. Rootlet solitary; fronds obscurely 1–5-nerved, green on both sides. 2. LEMNA
a. Fronds without rootlets, thick, ovoid or lenticular, and very minute, less than 1.4 mm. long. 3. WOLFFIA

1. **Spirodela** Schleid.

1. **S. polyrhiza** (L.) Schleid.

Floating on the quiet waters of ditches, marshes, and ponds, in waters not strongly calcareous; common.

N. S. to B. C., southw. to Fla., Tex., N. Mex., Nev., and s. Calif.; infrequent on the Atlantic Coastal Plain. Found also in tropical Am. and in the Old World.

2. **Lemna** L.

a. Fronds stipitate, remaining attached in a zigzag chain, wholly submerged. 1. *L. trisulca*

a. Fronds not stipitate, quickly becoming detached, floating on the surface. 2. *L. minor*

1. **L. trisulca** L.

Ponds, ditches, and quiet bays, especially abundant in cattail marshes; frequent.

The larger marshes about Cayuga Lake; along the shores of Cayuga Lake; Summit Marsh (*D.*!); Jennings Pond (*D.*).

N. S. to B. C., southw. to N. C., Ala., Tex., N. Mex., and Calif.;[*] apparently not found in noncalcareous regions, and hence rare or absent on the Atlantic Coastal Plain.

2. **L. minor** L.

Floating on the quiet waters of ditches, marshes, and ponds, in waters not strongly calcareous; very common, and widely distributed.

Throughout N. A. except in the extreme North; also widely distributed over the world.

3. **Wolffia** Horkel[7]

a. Fronds subglobular, coarsely cellular, submerged. 1. *W. columbiana*

a. Fronds ellipsoidal, finely cellular, floating on the surface. 2. *W. punctata*

1. **W. columbiana** Karst.

Quiet waters of sloughs, ponds, and the larger marshes, with no apparent reference to lime content; occasional.

Ringwood, 1923; Dryden Lake, 1916; cut-off from Red Mill Pond, Freeville, 1918; Cayuga Marshes, w. of Cayuga Bridge (*D.*!); Montezuma Marshes, near the "Marl Works" (*D.*); May Point (*D.*); Pout Pond, 1922.

Conn. to Minn., southw. to Fla. and La.; infrequent on the Coastal Plain. Found also in Mex. and S. A.

2. **W. punctata** Griseb. (*W. brasiliensis* of many authors.)

With the preceding species, w. of Cayuga Bridge near the Seneca Canal from 1894 to 1898; not seen recently; lime requirements not known.

Ont. to Mich., southw. to Tenn. Found also in Jamaica.

22. **COMMELINACEAE** (SPIDERWORT FAMILY)

1. **Commelina** (Plum.) L.

1. **C.** COMMUNIS L. DAYFLOWER.

A weed along roadsides and in waste places in rich soil; scarce. June–Sept.

In the Cayuga Lake Basin, known only about Ithaca: n. of L. V. R. R. station; Cascadilla Place, n. side; Quarry St.; Veterinary College grounds; garbage dump, lighthouse road; and elsewhere.

N. Y. to Kans., southw. to Fla. and Tex.; recently adventive at Ithaca from farther south, and spreading. Native of Asia.

[7] *Wolfia* Hork. and *Wolffia* Hork. ex Schleiden are different names, according to the International Code. While *Wolfia* is antedated by two other uses of the name, *Wolffia* is not antedated and is the oldest valid name of the present genus

23. PONTEDERIACEAE (PICKEREL-WEED FAMILY)

a. Plant erect; flowers blue; perianth 2-lipped; stamens 6; utricle 1-seeded; leaves cordate-ovate. 1. PONTEDERIA
a. Plant floating, or prostrate on mud; flowers yellow; perianth salver-form; stamens 3; capsule many-seeded; leaves linear. 2. HETERANTHERA

1. Pontederia L.

1. **P. cordata** L. PICKEREL-WEED.

In shallow or deep water along lake and stream margins, in mucky neutral or acid soil, rarely in gravel; scarce. July 20–Aug.
Cayuta Lake; Inlet and Cayuga Marshes; Duck Lake.
N. S. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

2. Heteranthera R. & P.

1. **H. dubia** (Jacq.) MacM. (*Schollera graminifolia* of Cayuga Fl.) WATER STAR GRASS.*

Slow streams, marshes, and on mud, if not too acid; locally abundant. July–Aug.
Abundant in the marshes of Cayuga Lake; rare elsewhere.
Que. and w. N. E. to Oreg., southw. to Fla. and Mex.; rare or absent on the Atlantic Coastal Plain. Found also in Cuba.

24. JUNCACEAE (RUSH FAMILY)

a. Capsule many-seeded; seeds minute; foliage never hairy. 1. JUNCUS
a. Capsule containing 3 large seeds; foliage with more or less arachnoid pubescence. 2. LUZULA

1. Juncus (Tourn.) L.

a. Leaves reduced to the sheath only; cyme appearing lateral, the solitary involucral leaf resembling a continuation of the culm.
  b. Stamens 3; plant green.
    c. Flowers 1.7–2.4 (2.6) mm. long; perianth soft, slightly spreading; cyme small, densely crowded; culms stout, with pale sheaths. [*J. effusus*, var. *compactus*]
    c. Flowers (2.3) 2.5–4.2 mm. long; perianth firmer; cyme loose.
      d. Sepals rarely exceeding either the petals or the capsule, 2.5–3.5 mm. long, not spreading, not contrasting in color with the capsule; culms 2–4.5 mm. in diam. just above the pale basal sheaths, not sulcate. 1. *J. e.*, var. *solutus*
      d. Sepals exceeding both the petals and the capsule, 2.8–4.2 mm. long, more rigid and more spreading, usually contrasting in color with the darker capsule; culms 1–3.5 mm. in diam. just above the blackish basal sheaths, striate or sulcate. 1a. *J. e.*, var. *Pylaei*
  b. Stamens 6; plant glaucous (capsule very dark, subacute.) 2. *J. inflexus*
a. Leaves with a well-developed blade; inflorescence terminal.
  b. Flowers borne singly in the cyme, not in heads; leaves flat and grass-like, or at least deeply channeled above.
    c. Inflorescence more than half the height of the very low plant; flowers scattered along the loose forking branches. 3. *J. bufonius*
    c. Inflorescence very much less than half the height of the taller plant.
      d. Uppermost leaf usually at or above the middle of the stem; perianth parts appressed, obtuse.
        e. Anthers three to four times as long as the filaments; perianth dark, nearly equaling the lighter subellipsoid capsule; bracts shorter than the inflorescence. 4. *J. Gerardi*

e. Anthers as long or twice as long as the filaments; perianth lighter, shorter than the darker subglobose or obovoid capsule; lowest bract exceeding the inflorescence. 5. *J. compressus*

d. Uppermost leaf much below the middle of the stem; perianth parts sharp-pointed, mostly spreading.

e. Auricles at summit of sheath produced into scarious lobes.

f. Inflorescence of medium size; flowers scattered or clustered, not racemose. 6. *J. tenuis*

f. Inflorescence many-flowered, diffuse; flowers somewhat racemose on the branches; plant taller and more strict. 6a. *J. tenuis* var. *anthelatus*

e. Auricles firm, but not cartilaginous, not produced; basal sheaths usually slightly purplish (see also 3d *e*). 7. *J. dichotomus*, var. *platyphyllus*

e. Auricles cartilaginous, not produced; basal sheaths pale. 8. *J. Dudleyi*

b. Flowers borne in heads in the cyme.

c. Leaves flat and grass-like. 9. *J. marginatus*

c. Leaves terete, nodulose (because of cross-diaphragms).

d. Seeds acute or obtuse, without caudate hyaline appendages.

e. Stamens 3 (none opposite the petals). 10. *J. acuminatus*

e. Stamens 6.

f. Capsule strongly subulate-acuminate; heads few, large (7–15 mm. in diam.), spherical; involucral bracts exceeding the cyme; rootstocks creeping, often tuber-bearing.

g. Plant low, 1.5–4 (6) dm. high; leaves erect; flowers 3–4 mm. long; petals equaling or longer than the sepals. 11. *J. nodosus*

g. Plant taller, 4–10 dm. high; leaves spreading, more or less at right angles to the stem; flowers 4–5 mm. long; petals much shorter than the sepals; heads very large. 12. *J. Torreyi*

f. Capsule ellipsoid or ovoid, acute or obtuse; heads smaller (6 mm. in diam. or less) and more numerous, hemispherical; involucral bracts shorter than the cyme; plants subcespitose; rootstocks short and not tuber-bearing.

g. Capsule strongly acute; sepals and petals acute or acutish; branches of the cyme usually divaricate; seeds with very fine scalariform markings in the areoles; culms often divaricate at base and somewhat decumbent. 13. *J. articulatus*

g. Capsule merely apiculate; sepals and petals more scarious-tipped, mostly obtuse; cyme usually with more ascending branches; seeds smooth or very indistinctly striate in the areoles; culms erect. 14. *J. alpinus*, var. *fuscescens*

d. Seeds caudate.

e. Branches of the cyme spreading; capsule slightly exceeding the perianth.

f. Heads 5–50-flowered, few or many; perianth parts subulate-tipped; plant tall, coarse. 15. *J. canadensis*

f. Heads 3–5-flowered, very numerous in a diffuse panicle; perianth parts less rigid, more obtuse and more scarious-margined; seeds shorter and broader; plant lower. 16. *J. brachycephalus*

e. Branches of the cyme ascending; capsule at least one-half longer than the perianth, gradually pointed. 17. *J. brevicaudatus*.

[**J. effusus** L., var. **compactus** Lej. & Court. (*J. e.*, var. *conglomeratus*, of Cayuga Fl.)

Damp situations; rare.

"South side of Taughannock, and elsewhere" (*D.* in Cayuga Fl. and C. U. Herb.); not seen since. The specimen is var. *Pylaei*.

Newf., along and near the coast to Mass. Found also in B. C. and Eu.]

1. **J. effusus** L., var. **solutus** Fernald & Wiegand. (See Rhodora 12: 81. 1910.)

Meadows, ditches, and the borders of marshes, in various soils not conspicuously calcareous; common. July–Aug.

Newf. to Wis., southw. to W. Va., including the northern Coastal Plain.

1a. **J. effusus** L., var. **Pylaei** (Leharpe) Fernald & Wiegand.

In situations similar to the preceding, abundant in pastures and springy places, less abundant on the larger marshes but not reported from marly soils; very common. July–Aug.

Newf. to Wis., southw. to W. Va., including the northern Coastal Plain.

The flowers vary considerably in size.

No true var. *decipiens* Fernald & Wiegand has yet been found in the Cayuga Lake Basin.

2. **J.** INFLEXUS L. (See Schinz & Thel., Bul. Herb. Bois., ser. 2, 7: 400. 1907. *J. glaucus* Ehrh.)

Meadows and swales; locally abundant. July.

Flats along Spencer St., Ithaca, and near the mouth of Buttermilk Creek, 1922, now rather abundant.

Native of Eurasia and Africa, and probably adventive at Ithaca. Previously reported from America by House, who collected it at Sangerfield, Oneida Co., N. Y., in 1917 (Rept. N. Y. State Bot. 1921).

3. **J. bufonius** L.

Silty and muddy ditches, roadsides, and shores, often in clay or sand but not in strongly calcareous soils; common. June 15–July.

Almost throughout N. A., extending to Lab.; cosmopolitan.

4. **J. Gerardi** Loisel. BLACK GRASS.

Marshy soils, in saline situations; rare. July 20–Aug.

Rocky bed of Fall Creek above Forest Home (a very unusual habitat); Myers Point (?); Union Springs; brackish marshes e. of Montezuma (*D.* in C. U. Herb.!), probably native.

Salt marshes along the coast, Newf. to Fla., and on the n. w. Pacific coast; inland in Me., Vt., N. Y., and about the Great Lakes. Found also in Eurasia and n. Africa.

Plants (probably introduced) near the salt works at Myers Point agree with this species in the length of bract and anther and in color of perianth, but are more like the species next following in length of perianth and shape of capsule.

5. **J.** COMPRESSUS Jacq.

In situations similar to the preceding; rare. July.

About the salt works, Ithaca flats (introduced); first detected in 1895, since which time it has persisted. These salt works, and also those at Myers, are recent, and did not exist in Dudley's time. *J. compressus* may have been introduced with sand and other material brought to a glass factory formerly existing near the salt works. It occurs also about the Freeville railroad station.

Native of Eu. and Asia; heretofore reported in N. A. only from Murray Bay (*Eggleston*) to Que. (*Pease*) and w. Newf. (*M. L. Fernald & K. M. W.*).

6. **J. tenuis** Willd. PATH RUSH.

Damp or rather dry grassland, most commonly in paths and on roadsides but also in waste places and on shores, in very diverse soils; common. June 20–Aug. 10.

Almost throughout N. A. except in the extreme North; adventive in Eu. and Afr.

6a. **J. tenuis** Willd., var. **anthelatus** Wiegand.

Damp pasture lands, in undrained, rather heavy, soil; rare. July.

Hill two miles s. e. of Brookton (*K. M. W., A. J. E., & L. F. Randolph*); n. w. of South Hill Marsh.

Me. to Mo. and Tex.

7. **J. dichotomus** Ell., var. **platyphyllus** Wiegand.

Brackish meadows; rare. June–July 15.

Salt flats e. of Montezuma village (*A. J. E., K. M. W., & L. F. Randolph*).

Along the coast from Mass. to Tex., also in cent. N. Y.

8. **J. Dudleyi** Wiegand. (*J. tenuis*, var., no. 946 of Cayuga Fl.)

Open springy places in meadows and on hillsides, in strongly calcareous soils, also on the moors of marl ponds; locally common. June–July.

Common in the McLean district, and from Paine Creek northw. to Conquest, and at Junius; frequent in the marl springs about the ravines; rare or absent in the chestnut soils of the hills s. of Ithaca.

Newf. to Sask., the Rocky Mts., and Wash., southw. to Va., Tenn., Kans., and Mex.; rare or absent on the Atlantic Coastal Plain.

Taller, stiffer, and more wiry than *J. tenuis*, with commonly smaller cymes and larger flowers having more divaricate rigid perianth divisions.

9. **J. marginatus** Rostk.

Low sandy, or sandy and clayey, fields, in subacid soils; frequent. July–Sept.

South Hill Marsh (*D.* in C. U. Herb.!); along Fall Creek above Forest Home; hillside s. of Brookton; hills n. of Caroline Center and in Richford; n. e. of Caroline; two miles n. w. of Freeville; w. of Freeville (*D.*); w. of Benson Corners; s. end of Bear Swamp, near Lansingville; Waterloo.

N. S. to Ont. and Nebr., southw. to Fla., including the Coastal Plain.

10. **J. acuminatus** Michx. (*J. a.*, var *legitimus*, of Cayuga Fl.)

Ditches and low fields, in various soils; frequent. July–Aug. 15.

Six Mile Creek; Forest Home; lake shore at Renwick; Ellis Hollow; Etna; Freeville, near village and at Mud Creek; along the railroad between McLean and Chicago stations; Montezuma; and elsewhere.

N. S. to Minn., southw. to Ga. and Tex., including the Coastal Plain.

The heads are often replaced by galls which appear as bunches of reduced leaves.

[**J. debilis** Gray. (*J. acuminatus*, var. *debilis*, of Cayuga Fl.)

"Junius" (Herb. Sartwell, fide *D.*); not seen by the writers; occurrence in this flora is doubtful.]

11. **J. nodosus** L.

Ditches, swales, and shores, in muddy or gravelly, more or less calcareous, soils; common and widely distributed in the soils indicated. June 25–July.

Newf. to B. C., southw. to Va., Ill., and Nebr.; rare or absent on the Atlantic Coastal Plain.

Dudley notes and describes a peculiar teratological form on Farley Point.

12. **J. Torreyi** Coville.

Low rich sandy nonacid soils; scarce and local. July–Aug.

Marsh along Spencer St. just s. of Ithaca; Wood River, Cayuga; n. w. of Spring Lake; and probably elsewhere.

Mass. to Sask. and Wash., southw. to Ala., Tex., and Ariz. A plant of the nonacid sands of the interior.

13. **J. articulatus** L.

Ditches and shores, in sandy or gravelly calcareous soils; frequent. July.

Six Mile Creek; Fall Creek, above Forest Home; Renwick; Big Gully; Utt, Farley, and Howland Points; shore n. of Cayuga Lake Park; Tyre; "on nearly all the sandy points of Cayuga L. Rarely remote from the lake" (*D.*).

Newf. to Mich. and B. C., southw. to Mass. and N. Y.; rare on the Atlantic Coastal Plain. Found also in Eurasia.

Dudley distinguishes certain depauperate specimens on Trumansburg Point, Utt Point, and the Marl Creek Meadows, as var. *obtusatus* Engelm.; but abundant material recently collected in those localities shows nothing sufficiently extreme to be considered that variety, which is of coastal distribution.

14. J. **alpinus** Vill., var. **fuscescens** Fernald. (*J. a.*, var. *insignis*, of Cayuga Fl.)
Gravelly and sandy calcareous shores; locally abundant. July–Sept.
Renwick; Taughannock Point (*D.*!); Utt Point (*D.*!); Big Gully Point; Farley Point; between Kidders and Sheldrake; Indian Salt Spring (type station).
Vt. to B. C. and Mo.
These plants all belong to this variety, though typical *J. alpinus* occurs at Tully Lake just outside the basin. Var. *fuscescens* differs from the typical form in that the numerous heads and branches give a more bushy paniculate or subcorymbose inflorescence, and the heads are usually without scattered, raised, pedicelled flowers. In 1918 there were found on Big Gully Point and in that vicinity very small plants without seed and with an appearance intermediate between that of *J. alpinus* and that of *J. articulatus*. These plants may have been hybrids of these two species.

15. J. **canadensis** J. Gay. (*J. c.*, var. *longicaudatus*, of Cayuga Fl.)
Calcareous marshes; frequent. Aug.–Sept.
Summit Marsh (*D.*!); Lake Como (Locke Pond, *D.*); moor of Junius marl ponds (*D.*!); Crusoe Prairie; Montezuma (*D.* in C. U. Herb.!); near Duck Lake; Spring Lake; Westbury Prairie.
Newf. to Minn., southw. to Ga. and La.; common on the Coastal Plain.
Near the coast this plant grows in acid bogs or in brackish marshes. Its occurrence about Cayuga Lake in marl bogs is difficult to explain. This may be due to the traces of salt in the springs of this region, a feature to which is apparently due the presence of other saline plants here. In the Cayuga Lake Basin this species is very variable in size of inflorescence and of heads.

16. J. **brachycephalus** (Engelm.) Buch. (*J. canadensis*, var. *brachycephalus*, of Cayuga Fl.)
Marl bogs and springs; frequent. Aug.–Sept.
Spencer Lake; near West Danby (*D.*!); w. of Key Hill; s. side of Coy Glen; Larch Meadow; e. of Slaterville (C. U. Herb.); Fir Tree Swamp between Slaterville and Dryden; Dryden Lake (*D.*!); s. of Groton (*D.*); by railroad, e. of McLean; Junius marl ponds (*D.*!).
N. Me. to Wis., southw. to Conn., Pa., and Ill.; absent on the Coastal Plain.

17. J. **brevicaudatus** (Engelm.) Fernald.
Ditches and muddy places: rare. Aug.–Sept.
Springy hillside e. of Cayutaville. [Frequent on the highlands of Cortland Co.]
Newf. to Minn., southw. to Conn., Pa., and W. Va.; infrequent on the Coastal Plain. A northern plant, generally found in both acid and subcalcareous soils.

2. Luzula DC.

a. Flowers solitary at the tips of the branches of the inflorescence. 1. *L. saltuensis*
a. Flowers in glomerules. 2. *L. campestris*, var. *multiflora*

1. **L. saltuensis** Fernald. (*L. pilosa* of Cayuga Fl.) WOOD RUSH.
Rich wooded banks, mostly in gravelly, more or less calcareous, soils; not uncommon. Apr. 15–May.
West Danby; hillside beyond Larch Meadow; Six Mile Creek, common; Fall Creek, near Triphammer Falls and e. of Forest Home; and elsewhere.

Newf. to Sask., southw. to N. Y., Mich., and Minn., and in the mts. to Ga.; rare or absent on the Coastal Plain. Found also in e. Asia.

2. **L. campestris** (L.) DC., var. **multiflora** (Ehrh.) Celak. WOOD RUSH.

Dry open woodlands, banks, and fields, in stony or gravelly, mostly chestnut, non-calcareous soils; frequent. May–June 15.

Hills s. of Ithaca, and on ravine crests, rarely in other situations: North Pinnacle, Caroline; lower Enfield Glen; South Hill, near the marsh; Six Mile Creek; n. of Beebe Lake; Cascadilla Creek; Esty Glen; n. of Forest Home; e. of Ludlowville; Utt Point; and elsewhere.

Newf. to Alaska, southw. to N. J., Pa., Ill., Utah, and Calif., including the Atlantic Coastal Plain. Found also in Eurasia.

25. LILIACEAE (LILY FAMILY)

ARTIFICIAL KEY TO THE GENERA [8]

a. Leaves all nearly or quite basal, or occasionally apparently wanting; plant scapose.
  b. Perianth conspicuously gamophyllous, very large, 8–11 cm. long, orange. 5. HEMEROCALLIS
  b. Perianth of separate parts, smaller, not orange.
    c. Flowers solitary, yellow, 2–3 cm. long; leaves mottled. 7. ERYTHRONIUM
    c. Flowers several, rarely solitary, smaller.
      d. Flowers white, pink, purplish, or greenish white; leaves at flowering time linear or wanting.
        e. Flowers strictly umbellate, often replaced by bulblets; odor of tissue strongly onion-like. 4. ALLIUM
        e. Flowers subcorymbose; odor of tissue not onion-like. 8. ORNITHOGALUM
      d. Flowers greenish yellow; leaves oval or elliptical. 10. CLINTONIA
a. Leaves cauline.
  b. Flowers large, 4–10 cm. in diam., orange, usually spotted; the perianth segments all similarly colored. 6. LILIUM
  b. Flowers smaller, or if large the calyx green.
    c. Leaves whorled.
      d. Blade parallel-veined; perianth segments all similar in color. 16. MEDEOLA
      d. Blade netted-veined; calyx green; corolla white or colored. 17. TRILLIUM
    c. Leaves alternate.
      d. Venation netted, but with a few strong parallel ribs; leaves cordate, petioled; flowers umbellate; plant tall, arching or climbing. 18. SMILAX
      d. Venation parallel; leaves, if cordate, on plants less than 2 dm. high; plants not climbing; inflorescence various.
        e. Flowers axillary, small, 4–19 mm. long.
          f. Perianth gamophyllous; flowers greenish. 15. POLYGONATUM
          f. Perianth of separate parts.
            g. Leaves (modified branches) thread-like; flowers greenish white. 9. ASPARAGUS
            g. Leaves broad; flowers pink. 14. STREPTOPUS
        e. Flowers terminal, solitary, large, 15–43 mm. long, yellow or straw color; perianth segments separate (see also 3d *e*). 3. UVULARIA
        e. Flowers in a terminal spike, raceme, panicle, or umbel, or, if solitary and terminal, then greenish, and the leaves strongly acuminate and the perianth segments separate.

[8] Fruit and underground parts, structures which frequently are not at hand, are important in a natural classification of genera in this family.

f. Inflorescence a 1–few-flowered umbel; flowers greenish; plant widely branched. 13. DISPORUM
f. Inflorescence a panicle or a short raceme; plant mostly unbranched.
g. Flowers paniculate, green; leaves broad, strongly plaited. 2. VERATRUM
g. Flowers racemose or paniculate, white; leaves not plaited or only slightly so (see also 3d *g*).
h. Perianth parts and stamens 4; leaves broad, cordate. 12. MAIANTHEMUM
h. Perianth parts and stamens 6; leaves tapering at base. 11. SMILACINA
g. Flowers in a long slender spike or a spike-like raceme, dioecious; leaves linear. 1. CHAMAELIRIUM

1. Chamaelirium Willd.

1. **C. luteum** (L.) Gray. (*C. Carolinianum* of Cayuga Fl.) DEVIL'S BIT.

Damp or rather dry sandy or gravelly acid soils, in open woods of oak and chestnut; scarce. June 15–July 15.

Ball Hill, Danby (*D.* in C. U. Herb.); Cascadilla woods (*D.*); Fall Creek woods (*D.*); C. U. farm (*D.* in C. U. Herb.); "Turkey Hill [!] and elsewhere" (*D.*); *n. e.* of Pout Pond.

W. Mass. to Mich., southw. to Fla., Ark., and Nebr.; rare on the Coastal Plain. The distribution of this plant is puzzling. Though occurring here in soils that suggest a Coastal-Plain distribution, it is almost entirely absent from that region (see W. Stone, Flora of N. J.).

2. Veratrum (Tourn.) L.

1. **V. viride** Ait. AMERICAN WHITE, FALSE, OR GREEN HELLEBORE.

Low meadows, woods, and the borders of marshes, in rich mucky or alluvial, probably almost neutral, soils; frequent. June–July.

Renwick flats; headwaters swamp of Pleasant Grove Brook; n. e. of Hanshaw Corners; Etna; Ringwood; McLean; Freeville; and elsewhere.

N. B. and Que. to Minn., Alaska (?), and Wash., southw. to Ga., Tenn., and Colo.; less frequent on the Atlantic Coastal Plain.

3. Uvularia L.

a. Capsule broadly truncate, obovoid, 3-lobed, angled, not winged; leaves perfoliate.
b. Perianth segments granulose within; stamens shorter than the styles; connective acuminate; carpels 2-ridged on the angles, 2-beaked; leaves glabrous. 1. *U. perfoliata*
b. Perianth segments glabrous within; stamens exceeding the styles; connective obtuse; capsule obtusely angled; leaves whitish-puberulent beneath. 2. *U. grandiflora*
a. Capsule acute at each end, with 3 winged angles; leaves sessile, not perfoliate. 3. *U. sessilifolia*

1. **U. perfoliata** L. PERFOLIATE BELLWORT. WILD OAT.

Open, rather dry, woodlands, mostly near ravines, in somewhat sterile gravelly or sandy, acid or subcalcareous, soils; frequent. May; flowering two weeks or more later than the species next following.

N. e. of Spencer; Caroline hills; Bull Hill, Newfield; near Lucifer Falls; Coy Glen; w. of Cayuta Lake; Beech Woods, Six Mile Creek; Beebe Lake; Ringwood; Esty Glen; Shurger Glen; cliffs n. of King Ferry; Paine Creek.

E. Mass. to N. Dak., southw. to Fla. and Miss.; less frequent on the Coastal Plain.

2. **U. grandiflora** Smith. LARGE BELLWORT. WILD OAT.

Dry or moist woodlands mostly near ravines, in gravelly or alluvial calcareous rich soils; common. Apr.–May.

In all the larger ravines and adjacent woods of the basin; rarely elsewhere, as: s. of Brookton; McGowan Woods; Cayuga Heights; Big Gully Point.

W. N. H. to Minn., southw. to Ga., Tenn., and Kans.; absent on the Coastal Plain. A plant of the rich soils of the interior.

In this species there are fewer leaves below the fork of the stem than in no. 1.

3. **U. sessilifolia** L. (*Oakesia sessilifolia* of manuals and of Cayuga Fl.) SESSILE BELLWORT. WILD OAT.

Dry or damp sandy or gravelly woodlands and ravine banks, in subacid soils; frequent. May.

Frequent in the chestnut soils of the hills s. of Ithaca; s. w. of Danby; s. e. of Brookton; near South Hill Marsh; Six Mile Creek; Cascadilla Creek, near Pomology Flats; Snyder Hill; Ellis Hollow; region of McLean Bogs; and elsewhere.

N. B. and Ont. to Minn., southw. to Ga. and Ark., including the Coastal Plain.

4. **Allium** (Tourn.) L.

a. Leaves elliptical, 2–5 cm. wide, perishing before the flowers appear; capsule strongly 3-lobed, each cell 1-ovuled; bulblets of the umbel wanting; perianth white. 1. *A. tricoccum*

a. Leaves linear, present at flowering time; capsule slightly lobed, the cells 2–several-ovuled; perianth pale pink or purple.

b. Pedicels shorter than the purple perianth; flowers not replaced by bulblets; leaves terete, hollow. [*A. Schoenoprasum*]

b. Pedicels longer than the pale pink perianth; many of the flowers replaced by bulblets; leaves flat or plano-convex. 2. *A. canadense*

1. **A. tricoccum** Ait. WILD LEEK.

Rich damp woodlands, in deep humus on gravelly or sandy neutral or subcalcareous soils; infrequent, but locally abundant. Leaves in May, flowers in July.

Woods around Michigan Hollow Swamp; Enfield Glen; hillside s. of Brookton; s. end of Wyckoff Swamp; Townley Swamp; McLean Woods; bottom-land woods in Taughannock Gorge; Big Gully; locally abundant in woods on the rich soils of the upper Salmon Creek region.

N. B. to Minn. and Iowa, southw. to Pa. and Tenn., and in the mts. to N. C. and Ga. (?), but only on the borders of the Coastal Plain. A plant of the rich soils of the interior.

[**A.** SCHOENOPRASUM L. CHIVES.

About old houses and roadsides, in rich soil; rare. June.

Near a deserted house, hillside near North Spencer; doubtfully established.

Escaped from cultivation. Native of Eu.]

2. **A. canadense** L. WILD GARLIC.

Damp sandy, gravelly, or stony, neutral, subcalcareous, or slightly acid, soils; mostly in alluvium, more rarely in cinders or talus; frequent. May 20–June.

Cinders along the railroad, Ithaca-Newfield town line; alluvium in Enfield Glen; Renwick woods; Fall Creek, on the island at Forest Home (*D.*!) and above, also below Ithaca Falls (*D.*); Cayuga Heights Road, near first iron bridge; shaly talus along railroad n. of Myers Point; field near salt well at Aurora (*D.*); and elsewhere.

N. B. to Minn. and Colo., southw. to Fla. and Tex., occurring sparingly on the Coastal Plain.

5. Hemerocallis L.

1. **H.** FULVA L. DAY LILY.

Damp gravelly or stony borders of streams, roadsides, or waste places, in rich, not too acid, soils; frequent. June 20–July.

Enfield Glen (*D.*!); Inlet Valley, near the Fleming Schoolhouse; s. of Coy Glen; Ithaca flats, near the salt works; near Judd Falls (*D.*!); Varna; near Esty Glen, and elsewhere.

N. B. to Ont., southw. to N. C. and Tenn.; escaped from cultivation. Native of Eurasia.

6. Lilium (Tourn.) L.

a. Leaves whorled, the axils not bulblet-bearing; perianth more or less funnel-form in outline, the segments rarely revolute from the base.
- *b*. Flowers erect; perianth segments unguiculate. 1. *L. philadelphicum*
- *b*. Flowers drooping; perianth segments sessile.
  - *c*. Perianth segments recurved from near the middle; leaves roughened on the veins beneath. 2. *L. canadense*
  - *c*. Perianth segments strongly recurved from near the base; leaves smooth. [*L. superbum*]

a. Leaves scattered, the axils usually bulblet-bearing; perianth segments revolute from the base. [*L. tigrinum*]

1. **L. philadelphicum** L. WOOD LILY.

Dry or rarely damp gravelly or sandy noncalcareous woodlands and banks; frequent. July.

On the sandstone chestnut soils of the hills w., s., and s. e. of Ithaca, on the ravine crests, and in the sandy country n. of Cayuga Lake; rare or absent in the McLean district and in the clays and richer soils back from the shores of Cayuga Lake.

Me. to Ont., southw. to N. C. and W. Va.; infrequent on the Coastal Plain.

The leaves are extremely variable in width.

2. **L. canadense** L. MEADOW LILY. CANADA LILY.

Rich mucky soil in low meadows, mostly on a gravelly substratum; frequent, occasionally locally abundant. July.

Michigan Hollow Swamp; South Hill; hillside s. of Coy Glen; woodlot n. of Forest Home; Varna; Ellis Hollow; Ringwood; Freeville Bog; Mud Creek, Freeville (*D.*!); Malloryville; McLean; Beaver Brook (*D.*!); and elsewhere.

E. Que. to Minn., southw. to Ga. and Mo.; infrequent on the Coastal Plain.

Highly variable in width of leaf and color of flower, the latter being either red or orange.

[**L. superbum** L.

Dudley lists this species as "frequent," while the preceding species is said to be "scarce." Many collectors have since attempted to locate *L. superbum* here, but without success. The material is all uniformly *L. canadense*.]

[**L.** TIGRINUM Ker. TIGER LILY.

Occasionally escapes from cultivation, but is very doubtfully spontaneous.

Native of e. Asia.]

7. Erythronium L.

1. **E. americanum** Ker. YELLOW ADDER'S-TONGUE. DOG'S-TOOTH VIOLET.

. Rich gravelly or alluvial banks, in nonacid soils; common. Apr.–May.

Frequent in the above-named soils near Ithaca, becoming much more common in the Ellis Hollow, Freeville, and McLean regions, and on some of the richer soils n. of Ithaca.

N. B. to Ont. and Minn., southw. to Fla., Tenn., and Tex.; rare or absent on the Coastal Plain.

8. **Ornithogalum** (Tourn.) L.

1. **O.** UMBELLATUM L. STAR-OF-BETHLEHEM.

Occasionally escapes from cultivation: Ferris Place, Ithaca; cemetery, University Ave. (*D.* in C. U. Herb.); island in Beebe Lake, 1880 (*D.*); roadside n. of Taughannock Gorge; road n. e. of Duck Lake.

Native of Eu.

9. **Asparagus** (Tourn.) L.

1. **A.** OFFICINALIS L. GARDEN ASPARAGUS.

Rich gravelly grassy slopes and hillsides, and by roads; frequent.

Escaped from cultivation: Spencer; roadside n. of L. V. R. R. station, Ithaca; rocks above Beebe Lake, and above Forest Home; and elsewhere; "frequent on the lake shore from Lake Ridge to Ludlowville Sta." (*D.*).

Native of Eu.

10. **Clintonia** Raf.

1. **C. borealis** (Ait.) Raf.

Damp mossy or peaty woodlands, in humus, in both acid and alkaline regions (*immediate soil probably acid*); *frequent. May 25–June.*

Van Etten; Michigan Creek valley; woods s. of Caroline Depot; low woods e. of Slaterville; Ellis Hollow Swamp (*D.*!); Ringwood; Beaver Brook; McLean Bogs; "abundant near Freeville, McLean and Danby" (*D.*!); Townley Swamp; Dryden-Lansing Swamp (*D.*).

Lab. to Man. and Minn., southw. to N. C. and Wis., including the northern Coastal Plain.

11. **Smilacina** Desf.

a. Flowers paniculate, minute; perianth segments 1–2 mm. long; rootstocks stout; leaves large, elliptic-oval, 3.5–7 cm. wide, abruptly acuminate, contracted at base; not glaucous. 1. *S. racemosa*

a. Flowers racemose; rootstocks rather slender.

b. Leaves many, broad and subclasping at base, lanceolate, acute or obtusish, very glaucous; perianth segments 3–4 (5) mm. long. 2. *S. stellata*

b. Leaves 2–4, narrowed at base, elliptical, acuminate, not glaucous; perianth segments 4–5 mm. long. 3. *S. trifolia*

1. **S. racemosa** (L.) Desf. FALSE SOLOMON'S SEAL. FALSE SPIKENARD.

Rich woodlands, in humus on sandy or gravelly, both acid and alkaline, soils; common. May 20–June.

In nearly all the ravines and rich hillside woods of the basin.

N. S. to B. C., southw. to Ga., Mo., and Ariz., including the Atlantic Coastal Plain.

2. **S. stellata** (L.) Desf.

Low swampy thickets and banks, in rich gravelly, sandy, or alluvial, more or less calcareous, soils; frequent. May–June 10.

Along the Inlet; Mud Creek, Freeville; Malloryville; region of McLean Bogs; *Myers Point; edge of Westbury Bog; Crusoe Prairie; and elsewhere; not reported* from the towns s. of Ithaca.

Lab. to B. C., southw. to Va., Ky., Kans., and Calif., including the Atlantic Coastal Plain. Found also in Eu.

3. **S. trifolia** (L.) Desf.

In sphagnum of calcareous bogs and springy places; rare except on the Ontario plain. June.

Spruce Swamp, *Enfield (D.); arbor vitae swamp e. of Clyde; Westbury Bog;* n. e. end of Duck Lake.

Lab. to B. C., southw. to n. N. J., Pa., and Mich., including the northern Atlantic Coastal Plain. Found also in n. Asia.

12. Maianthemum Wiggers

1. **M. canadense** Desf. FALSE LILY-OF-THE-VALLEY. TWO-LEAVED FALSE SOLOMON'S SEAL.

Dry or damp woodlands and banks, on gravelly acid or somewhat calcareous soils; common. May 25–June 20.

Especially abundant on the crests of the ravines of the basin, and about the peat bogs; frequent under conifers.

Lab. to Mass. and N. Dak., southw. to N. C., Tenn., and Iowa, including the Coastal Plain.

13. Disporum Salisb.

1. **D. lanuginosum** (Michx.) Nichols. (*Prosartes lanuginosa* of Cayuga Fl.)

Rich damp woodlands; infrequent. May.

S. e. corner of Enfield Township; upper Buttermilk Glen; hill s. e. of White Church; hill s. e. of Brookton; Caroline, on Bald and Taft Hills (*D.*!); Six Mile Creek, Beech Woods slope (*D.*); McGowan Woods (*D.*!); Fall Creek, near Ithaca-Dryden town line; e. of Etna; Turkey Hill and Rhodes Woods (*D.*); Ringwood; between Jacksonville and Waterburg.

Ont. and w. N. Y. to Ohio, southw. to Ga. and Tenn. A plant of the rich lands of the Ohio Basin and the western slope of the Alleghenies.

14. Streptopus Michx.

1. **S. roseus** Michx. TWISTED STALK.

Rich damp woodlands, in humus on gravelly, more or less calcareous, soils; frequent. May.

In most of the ravines and swamps of the basin: Michigan Hollow; Newfield Swamp; Enfield Glen; Coy Glen; Six Mile Creek; McLean Bogs; Beaver Brook; and elsewhere.

Newf. to Man. and Wis., southw. to n. N. J. and Pa., and in the mts. to Ga.; also from Alaska to Oreg.; rare or absent on the Atlantic Coastal Plain.

15. Polygonatum (Tourn.) Hill

a. Leaves puberulent beneath, sessile; flower clusters about 2-flowered; perianth 9–12 (15) mm. long; filaments papillose-roughened, inserted high on the perianth tube. 1. *P. pubescens*

a. Leaves glabrous, clasping; flower clusters 2–8-flowered; perianth (13) 14–19 mm. long; filaments glabrous or papillose, inserted at the middle of the perianth tube. 2. *P. biflorum*

1. **P. pubescens** (Willd.) Pursh. (*P. biflorum* of Gray's Man., ed. 7, and of Cayuga Fl.) SMALL SOLOMON'S SEAL.

Rich woodlands, in gravelly or stony, nearly neutral, soils; common, and generally distributed. May.

N. B. and N. S. to Ont. and Mich., southw. to Fla., Tenn., Kans., and Tex.; mostly absent on the Coastal Plain.

2. **P. biflorum** Walt. (*P. commutatum* of Gray's Man., ed. 7. *P. giganteum* of Cayuga Fl.) GREAT SOLOMON'S SEAL.

Sandy or gravelly, rarely clayey, banks and thickets, in subneutral soil, on dry hillsides and hilltops, or in alluvial calcareous soils on river banks; frequent. June.

Top of hill, Spencer; crest of North Pinnacle, Caroline; Inlet Valley, s. of Ithaca; Enfield Glen; Six Mile Creek; Dwyer Pond; Beebe Lake; ravine between Renwick and McKinneys; and elsewhere.

W. N. H. to Man. and the Rocky Mts., southw. to Ga., La., N. Mex., and Ariz.; much less frequent on the Coastal Plain.

Farwell (Bul. Torr. Bot. Club **42**: 247. 1915) is undoubtedly right in applying the name *P. biflorum* (Walt.) Ell. to the *commutatum* group. His division of that group into two species, however, can scarcely be accepted. After an investigation of the filaments on plants from all over the range, it appears that they may be either smooth or papillose, but that this character is not correlated with the variations in leaf outline. The differences in color of the flowers cited by Farwell is not apparent. Unfortunately it would seem, therefore, that the name *P. biflorum* must be adopted for the whole *commutatum* group. Two forms of *P. biflorum*, as thus understood, occur in the Cayuga flora: one is a plant of upland wooded banks, with elliptic or elliptic-lanceolate leaves; the other grows in rich alluvial soils, and is very coarse and erect, with broader, more veiny leaves, more inclined to the stem; but no constant structural characters separate these two forms. The soil requirements of *P. biflorum* are not yet fully understood.

16. Medeola (Gronov.) L.

1. **M. virginiana** L. INDIAN CUCUMBER ROOT.

Damp sandy or gravelly humus, and light acid soils; common. June.

General throughout the basin, in gravelly soils.

N. B. to Minn., southw. to Fla. and Tenn.; frequent on the Coastal Plain.

17. Trillium L.

a. Stigmas short, stout, tapering from the base to the apex, recurved at the tip, about half as long as the sharply 6-angled or winged ovary.

b. Ovary white or nearly so; peduncles recurved or reflexed under the leaves; petals moderately or strongly spreading, color white, cream, or pinkish; anthers equaling or slightly shorter than the stigmas; plants of bottom lands; flowers May 15–June 20, not ill-scented.

c. Anthers 2.5–6.5 mm. long, one-third longer than the filaments or less, pinkish; petals 5–17 mm. broad, 15–26 mm. long; peduncles 0.8–4 cm. long, recurved or reflexed; leaves usually slightly contracted into an obscurely petioled base. 1. *T. cernuum*, var. *macranthum*

c. Anthers 6–15 mm. long, twice as long as the filament or more, yellowish white; petals 10–34 mm. broad, 20–50 mm. long; peduncles 3–12 cm. long, straight, horizontal, or slightly reflexed; leaves usually not at all petioled. [*T. declinatum*]

b. Ovary dark purple; peduncles erect or spreading; petals spreading above, brownish purple or greenish yellow; anthers equaling or slightly exceeding the stigmas; leaves strictly sessile; plants of hillsides, with longer leaves in proportion to the height than in the two last-named species; flowers Apr. 20–May, ill-scented. 2. *T. erectum*

a. Stigmas slender and of uniform diameter, erect or spreading, usually more than half as long as the sharply or obtusely angled ovary.

b. Leaves sessile; ovary sharply 6-angled; anthers exceeding the stigmas; petals obovate, white, turning pink with age; fruit subglobose. 3. *T. grandiflorum*

b. Leaves short-petioled; ovary obscurely 3-lobed; anthers equaling or shorter than the stigmas; petals elliptic-lanceolate, white with purple base; fruit short-oblong. 4. *T. undulatum*

1. **T. cernuum** L., **var. macranthum** Eames & Wiegand. (See Rhodora **25**: 191. 1923.)

Low, mucky, mostly acid, soils in calcareous regions; rare. May 20–June 15.

Low island in swamp, McLean Bogs (*D*.!). A considerable colony exists here, but the plant has not been found elsewhere in this flora.

Vt. to Ont. and Mackenzie, southw. to Pa., Ill., and Sask.

[T. **declinatum** (Gray) Gleason.

Alluvial bottom lands and rich woods. May 15–June 20.

Cent. N. Y. to s. Minn., southw. to Mo.

This species, which is closely related to *T. cernuum*, has been found in Monroe Co., N. Y. (*M. S. Baxter, K. M. W.*, & others), and as far east as Wayne Co. (*Hankenson*, 1879). This latter station is on the border of the Cayuga Lake Basin, and the plant very likely will be found farther east within the limits of the flora. Hankenson says, in a letter to Dr. Gray: "It grows in copses along creek flats usually in alluvial soil here [Newark] and farther east along Clyde River in this county and not in company with *T. erectum* but with such plants as *Mertensia virginica*. The ped. is ascending at first but as the flower gets older the petals become revolute and the ped. horizontal..... ......stems stout, usually clustered 2–4, flowering a little later than *T. erectum* or *T. grandiflorum*." The plant was formerly considered to be a variety of *T. erectum*, but the time of flowering, the odor of the flower, the habit, and the habitat are nearly the same as those of *T. cernuum*. The *T. erectum*, var. *declinatum*, of the *Cayuga Flora* cannot now be identified.]

2. **T. erectum** L. PURPLE TRILLIUM. BIRTHROOT. BETHROOT.

Damp banks and rich woodlands, in humus underlaid with more or less calcareous gravels and loams; frequent. May.

In most of the ravines of the basin; Ellis Hollow; the McLean region; Venice, rare or absent on the chestnut-vaccinium soils.

E. Que. to Ont., southw. to Pa. and Tenn., and in the mts. to N. C.; rare or absent on the Coastal Plain.

A form with greenish yellow corolla (forma *albiflorum* Hoffm., Proc. Bost. Soc. Nat. Hist. **36**: 244, 1922, the first name as "forma") occurs sporadically.

3. **T. grandiflorum** (Michx.) Salisb. WHITE TRILLIUM. WAKE ROBIN.

Rich woodlands, if not too dry, in humus underlaid with more or less calcareous gravels or loams; very common. May.

Extremely abundant in many ravines of the basin and in damp woodlands, and, when in flower, appearing like white stars in the vistas between the trees. Perhaps the most characteristic spring flower in this region.

W. Que. and w. Vt. to Minn., southw. to N. C. and Mo.; rare or absent on the Coastal Plain. A plant of the rich lands of the interior.

Monstrosities of various sorts are frequent. A very extensive series showing the transformation of floral parts to leaves was obtained by W. C. Muenscher in Big Gully in 1923.

4. **T. undulatum** Willd. (*T. erythrocarpum* of Cayuga Fl.) PAINTED TRILLIUM.

Damp or dry woodlands about bogs and on hilltops, in gravelly noncalcareous soils; locally frequent. May.

Swamps of Newfield, Spencer, Danby, Caroline, Dryden, Freeville, and McLean; Dryden-Lansing Swamp (*D.*); dry woods of the higher hilltops of Caroline, Danby, and Newfield; Duck Lake woods.

E. Que to Ont. and Wis., southw. to Conn., Pa., and in the mts. to Ga.; rare or absent on the Coastal Plain. It is difficult to determine whether this plant is influenced in its local distribution more by the cooler habitats of a northern range, or by the soil.

18. Smilax (Tourn.) L.

a. Stems herbaceous, unarmed; flowers carrion-scented; umbels large; peduncles 4–20 cm. long; ovules 2 in each cell. 1. *S. herbacea*

a. Stems woody, densely beset with black bristly prickles; flowers not carrion-scented; umbels small; peduncles 2–5 cm. long; ovule solitary. 2. *S. hispida*

1. **S. herbacea** L. CARRION FLOWER.

Rich moist gravelly thickets, with little apparent reference to the lime content of the soil; frequent. June.

Near Cayuta Lake; Inlet Valley; Coy Glen; South Hill; Cascadilla woods (*D.*); Beebe Lake (*D.*); Turkey Hill; e. of Caroline Center; McGowan Woods; e. of Ludlowville; n. w. of East Lansing; w. of Howland Island.

N. B. to Man., southw. to Fla., La., Nebr., and Tex.; infrequent on the Coastal Plain.

2. **S. hispida** Muhl. GREEN BRIER.

Damp woodlands and moist thickets, in rich loamy, often alluvial, soils; frequent. June.

Enfield Glen (*D.* in C. U. Herb.); Cascadilla woods (*D.*!); Fall Creek woods (*D.*); Slaterville Swamp; alluvial woods n. of Mecklenburg; Salmon Creek, w. of Genoa; Lake Como; w. of Howland Island.

Conn. to Minn., southw. to N. C. and Tex.; absent on the Coastal Plain. A plant of the interior.

26. AMARYLLIDACEAE (AMARYLLIS FAMILY)

1. Hypoxis L.

1. **H. hirsuta** (L.) Coville. (*H. erecta* of Cayuga Fl.) STAR GRASS.

Dry gravelly or sandy grassy slopes near woods, in acid soils; frequent. June–July.

On the chestnut acid soils w., s., and s. e. of Ithaca, on the crests of the ravines and the cliffs of Cayuga Lake, and in the sands n. of the lake: Enfield; South Hill; Turkey Hill; Cascadilla woods (*D.*!) Fall Creek woods (*D.*!); w. of Asbury; and elsewhere. Absent in the McLean district and on the clays and rich soils back from the lake shore.

S. w. Me. to Sask., southw. to Fla., e. Kans., and Tex. A characteristic plant on the Coastal Plain.

27. IRIDACEAE (IRIS FAMILY)

a. Style branches broad and petaloid, opposite the anthers; flowers very large; plants flag-like. 1. IRIS

a. Style branches filiform, alternate with the anthers; flowers small; plants grass-like. 2. SISYRINCHIUM

1. Iris (Tourn.) L.

a. Flowers blue; capsules 25–45 mm. long; plant 5–8 dm. tall. 1. *I. versicolor*

a. Flowers yellow; capsules 50–70 mm. long; plant 10–17 dm. tall. 2. *I. pseudacorus*

1. **I. versicolor** L. BLUE FLAG.

Swamps and meadows, in various, more or less acid, soils; common. June.

Lab. to Man., southw. to Fla. and Ark., including the Coastal Plain.

2. I. PSEUDACORUS L. YELLOW IRIS.

Marshes; scarce. June–July.

Brook bed, Bald Hill, Caroline; Inlet Marshes (*D.*!); Dwyer Pond; s. of Union Springs, near the railroad (*D.*!); Howland Point.

Newf. to N. Y. and N. J. Adventive from Eu.

A most beautiful plant.

2. Sisyrinchium L.

a. Stem below the inflorescence 2.5 mm. in diam. or less; umbels solitary, rarely 2; lower bract, subtending the umbel, much exceeding the other; pedicels equaling or slightly shorter than the second bract. 1. *S. angustifolium*

a. Stems 3 mm. in diam., flexuous; umbels 2 or more, rarely solitary; lower bract scarcely longer than the other (longer when umbel is solitary); pedicels slightly longer than the second bract; plant coarser. 2. *S. gramineum*

1. **S. angustifolium** Mill. (*S. anceps* of Cayuga Fl., first form.) BLUE-EYED GRASS.

Damp grassy fields, in sandy or gravelly neutral or acid soils; rather common. June.

Generally distributed in the gravels of the basin; absent on the clays (?).

Newf. to B. C., southw. to Va., N. C. (?), Mich., Minn., including the Atlantic Coastal Plain, and in the Rocky Mts.

2. **S. gramineum** Curtis. (*S. anceps* of Cayuga Fl., second form.) BLUE-EYED GRASS.

In situations similar to the preceding, perhaps in more acid soils; equally common. June–July 10.

Newf. (?) and N. S. to Minn., southw. to Fla., Ark., and Tex.; more common on the Coastal Plain than the last-named species.

28. ORCHIDACEAE (ORCHID FAMILY)

ARTIFICIAL KEY TO THE GENERA[9]

a. Anthers 2, lateral on the column, with a third enlarged sterile flattened stamen partly closing the orifice of the moccasin-shaped labellum. 1. CYPRIPEDIUM

a. Anther 1, terminating the column (the two anther-cells should not be mistaken for separate anthers); labellum flat or concave, but not moccasin-shaped.

b. Flowers spurred.

c. Glands of the two pollinia convergent, contained in the same pouch over the stigma; lip white, spotted; petals and sepals purple. 2. ORCHIS

c. Glands of the two pollinia divergent, widely separated on either side of the stigma; perianth concolorous. 3. HABENARIA

b. Flowers not spurred, at most merely saccate-ventricose.

c. Flowers large (perianth 1.5–4.5 cm. long); column moderately or much elongated.

d. Leaves linear, or reduced to sheaths only; flowers pink or purple.

e. Flowers few in a raceme; perianth not gamophyllous, apparently inverted (really straight, since orchid flowers are normally inverted) with the labellum uppermost. 7. CALOPOGON

e. Flowers solitary, terminal; perianth gamophyllous, apparently not inverted, ringent. 8. ARETHUSA

d. Leaves elliptical or oval.

e. Flowers racemose, pink; column not denticulate at apex; anther erect; pollen grains compound, pitted; subterranean parts tuberous and substoloniferous. 4. TRIPHORA

e. Flowers solitary, rarely 2, pink or brownish; column denticulate at apex; anther incumbent, the loculi facing downward; pollen grains not pitted; tubers and stolons wanting.

f. Leaf solitary; sepals equaling the lip; pollen grains simple. 5. POGONIA

f. Leaves whorled; sepals narrow, much exceeding the lip; pollen grains compound. 6. ISOTRIA

c. Flowers smaller (perianth 1 cm. long or less), few or many, never normally solitary; column short or moderately elongated.

d. Green foliage present at flowering time; stem green; flowers white, green, or brown.

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[9] Natural synopses in this family are based on column and pollen characters, and are difficult to use unless the material is in first-class condition and the operator is skilled.

e. Sepals and petals, except the lip, erect and connivent; flowers small, numerous, white or greenish white, in spiral or secund spikes.
f. Lip saccate; leaves ovate or elliptical, mostly variegated, basal. 11. EPIPACTIS
f. Lip not saccate; leaves ovate or linear, never variegated, basal or cauline. 10. SPIRANTHES
e. Sepals and petals free, usually divaricate; flowers greenish or purplish.
f. Sepals 8–10 mm. long; flowers many, in a long raceme; leaves many-nerved, plaited, papery; plant 25–60 cm. high. 9. SERAPIAS
f. Sepals less than 6 mm. long; leaves inconspicuously veined, waxy; plant 3–25 cm. high.
g. Leaf solitary. 14. MICROSTYLIS
g. Leaves 2, appearing opposite, cauline. 12. LISTERA
g. Leaves 2, basal. 15. LIPARIS
d. Green foliage absent at flowering time (the remains of a single broad, many-veined, plaited, papery, basal leaf may be present in the first-named genus); stem and flowers brownish.
e. Sepals 12 mm. long; plant from a globular corm. 16. APLECTRUM
e. Sepals 6 mm. long or less; plant from coral-like rootstocks. 13. CORALLORRHIZA

1. Cypripedium L.

a. Plant leafy-stemmed; flowers 1–2, rarely several; lip not fissured in front.
b. Lip yellow, shorter than the brownish, linear-lanceolate, acute sepals and petals.
c. Lip 2–3 cm. long; sepals deep purple-brown. 1. *C. parviflorum*
c. Lip 3.5–5 cm. long; sepals paler, shorter. 1a. *C. p.*, var. *pubescens*
b. Lip white flushed with purple; sepals and petals greenish white, broad, obtuse. 2. *C. reginae*
a. Plant acaulescent, 1-flowered, 2-leaved at the base; lip pink, fissured in front. 3. *C. acaule*

1. **C. parviflorum** Salisb. SMALLER YELLOW LADY'S SLIPPER.

Boggy and springy places, in marly, rarely subacid soils; infrequent. May 25–June 15.

Headwaters Swamp; Michigan Hollow Swamp (*D.*!); Six Mile Creek (*D.*!); Cascadilla woods (*D.*); near Freeville (*D.*); Mud Creek, Freeville; Malloryville (*D.*!); larch and arbor vitae swamp, Savannah; boggy woods s. w. of Westbury.

Newf. to B. C. and Wash., southw. to Ga., Mo., and Nebr.; rare or absent on the Atlantic Coastal Plain.

1a. **C. parviflorum** Salisb., var. **pubescens** (Willd.) Knight. (*C. pubescens* of Cayuga Fl.) LARGER YELLOW LADY'S SLIPPER.

In situations similar to the preceding, but often drier; frequent. May 25–June.

Headwaters Swamp; Enfield Glen; Coy Glen; Six Mile Creek; University Grove, formerly (*Dr. Jordan*); Cascadilla woods (*D.*); Ellis Hollow Swamp; swamp e. of Slaterville; Fir Free Swamp between Slaterville and Dryden; Mud Creek, Freeville; "abundant in the swamps of Freeville, Beaver Cr. and elsewhere" (*D.*), however, apparently not so abundant as implied in the foregoing statement; often in rich, rather dry woods, as at Enfield Glen, upper Six Mile Creek, and the Caroline hills.

N. S. to Minn., southw. to Ga. and Nebr.; rare near the coast.

Perhaps only an extreme of the preceding species, and doubtfully worthy of nomenclatorial distinction. Knight (Rhodora **8**: 93. 1906) claims to have seen one form change into the other when transplanted to garden soil.

2. **C. reginae** Walt. (*C. spectabile* of Cayuga Fl. *C. hirsutum* of Gray's Man., ed. 7.) SHOWY LADY'S SLIPPER.

Boggy and springy places, in mucky calcareous soils; frequent in such situations. June 15–July 20.

Headwaters Swamp; Michigan Hollow Swamp (*D.*); "scarce in Larch Meadow, Buttermilk ravine, and Enfield ravine" (*D.*); Fir Tree Swamp between Slaterville and Dryden; Mud Creek, Freeville (*D.*!); Malloryville; near Mud Pond, McLean Bogs; Beaver Brook (*D.*!); Wyckoff Swamp (*D.*!); arbor vitae swamp e. of Clyde; Tyre; Miller Bog, Spring Lake; Westbury Bog. "The most splendid of our native orchids, this species is seen in perfection in the half shaded sphagnum openings in the middle of thick swamps" (*D.*).

Newf. to Minn., southw. to Ga.; rare or absent on the Coastal Plain.

Miller's name, *C. hirsutum*, cannot be identified with certainty. The description suggests *C. acaule*.

3. **C. acaule** Ait. STEMLESS LADY'S SLIPPER. MOCCASIN FLOWER.

Woods or thickets, in acid humus on sandy, gravelly, or even limy soils; frequent. June.

On the chestnut-vaccinium soils w., s., and s. e. of Ithaca, on the ravine crests, in the sandy soils n. of Cayuga Lake, and on hummocks in bogs and swamps: Connecticut Hill; Spencer hills; Michigan Hollow region, with laurel and sweet fern; Caroline Pinnacles; Slaterville; Enfield Glen; Buttermilk Glen; Cascadilla woods (*D.*); Fall Creek (*D.*!); Ringwood; Mud Creek, Freeville; Dart Woods (*D.*); Rhodes Woods (*D.*); McLean Bogs; Junius Woods; near Duck Lake.

Newf. to Minn. and Man., southw. to N. C. and Tenn. A characteristic plant on the Coastal Plain.

Wherry has recently shown (Journ. Washington Acad. Sci. **8**: 589. 1918) that even when growing above marl the roots of acid-loving orchids are usually surrounded by acid soils.

2. Orchis (Tourn.) L.

1. **O. spectabilis** L. SHOWY ORCHIS.

Dry or well-drained woodlands and banks, in rich, somewhat calcareous or slightly acid, gravelly soils; not uncommon. May 20–June 10.

Coy Glen; Six Mile Creek; Mud Creek, Freeville; Chicago Bog; Howland Island; Stark Pond; Spring Lake; and elsewhere. "Evenly and sparingly distributed throughout our Cayuga L. basin" (*D.*).

N. B. to Ont. and Dak., southw. to Ga., Ky., Mo., and Nebr.; rare on the Coastal Plain.

3. Habenaria Willd.[10]

a. Lip not fringed.
  b. Lip oblong, truncate, the apex with 2–3 terminal teeth or entire.
    c. Cauline leaves 1–2; lip entire at base; bracts shorter than the flowers. — 1. *H. clavellata*
    c. Cauline leaves several; bracts longer than the flowers.
      d. Spur shorter than the lip; lip not hastate. — 2. *H. bracteata*
      d. Spur longer than the lip; lip hastate, and with a median protuberance on the upper side. — 3. *H. flava*, var. *virescens*
  b. Lip lanceolate to linear; apex entire, and subacute or rounded.
    c. Leaves cauline, elliptic-lanceolate or linear-lanceolate.
      d. Lip not dilated at base; flowers greenish, scarcely fragrant. — 4. *H. hyperborea*
      d. Lip dilated at base; flowers white, fragrant. — 5. *H. dilatata*

[10] Habenaria is a well-rounded, easily recognized genus, and should be retained with its comprehensive limits. Under the International Rules this name will stand, as Habenaria Willd. and Bonatea Willd. were first united under the name Habenaria.

c. Leaves 2, basal, oval or orbicular, spread flat on the ground.
d. Lip lanceolate, 1 cm. long; spur 18–20 mm. long; scape bractless. 6. *H. Hookeri*
d. Lip linear, 1.5–2 cm. long; spur 22–37 mm. long; scape bracted; leaves usually larger. 7. *H. orbiculata*
a. Lip fringed.
b. Body of lip oblong, fringed along sides and tip.
c. Flowers yellow; fringe of lip 3–5 mm. long. 8. *H. ciliaris*
c. Flowers white; fringe of lip 0.5–1.5 mm. long. 9. *H. blephariglottis*
b. Body of lip 3-parted.
c. Flowers greenish; divisions of lip deeply cleft into a long capillary fringe. 10. *H. lacera*
c. Flowers purple or lilac; divisions of lip fan-shaped, fringed at the truncate apex.
d. Lip 1–1.2 cm. wide; flowers deep purple. 11. *H. psycodes*
d. Lip 1.8–2 cm. wide, more deeply fringed; flowers lilac. 12. *H. fimbriata*

1. **H. clavellata** (Michx.) Spreng. (*H. tridentata* of Cayuga Fl.)

Sphagnum bogs and boggy meadows in somewhat acid soil, apparently in most cases on a calcareous or even a distinctly marly substratum; scarce. July 15–Aug. 15.

Ringwood; Mud Creek, Freeville (*D.*!); McLean Bogs; Beaver Brook; Freeville Bog (*D.*); Westbury Bog; Featherbed Bog; Spring Lake; moor of Junius marl ponds.

Newf. to Minn., southw. to Fla. and La., including the Coastal Plain.

Spurless plants occur at Mud Creek (*D.*!) and Ringwood. The soil preference of this species is perplexing. The plant grows in calcareous bogs here, but occurs in acid bogs on the Coastal Plain. However, in N. J. it is really abundant only in the pine-barren region, where the soil is presumably impregnated with salts.

2. **H. bracteata** (Willd.) R. Br. (*H. viridis*, var. *bracteata*, of Cayuga Fl.)

Damp woodlands, in rich, somewhat acid (?) humus over calcareous soils; rare. June.

Ravine n. of Buttermilk Glen? (*D.*); rich woods s. e. of Duck Lake (*F. P. Metcalf & A. H. Wright*).

N. S. to Alaska, southw. to Pa. and Nebr., and in the mts. to N. C.; apparently rare or absent on the Atlantic Coastal Plain. Found also in e. Asia.

3. **H. flava** (L.) Gray, var. **virescens** (Muhl.) Fernald. (See Rhodora **23**: 148. 1921. *Perularia virescens* of Cayuga Fl.)

Low woods and thickets, in rather light but somewhat acid soils; scarce. June 20–July 20.

Headwaters Swamp (*A. H. Wright*); "open meadow, with club mosses, between Bald Hill and Taft Hill, Caroline" (*D.*); dry pasture s. of Brookton; Dart Woods (*D.*); South Hill Marsh; Inlet Marshes (*D.* in C. U. Herb.); between Fall Creek and Cayuga Lake (*F. C. Curtice*); Ringwood; n. e. of Hanshaw Corners; Townley Swamp; Botrychium Woods, Spring Lake; e. of Duck Lake.

N. S. to Minn., southw. to Fla., La., and Mo.; apparently infrequent on the Coastal Plain.

4. **H. hyperborea** (L.) R. Br.

Boggy and springy places, in calcareous soils, rarely in the rich soils of calcareous woodlands; frequent. June 15–Aug. 15.

S. of Caroline Depot; Michigan Hollow Swamp; w. of Key Hill; Enfield Glen; headwaters of Six Mile Creek; McGowan Woods; Ellis Hollow; Ringwood; Mud Creek, Freeville; Malloryville; McLean Bogs; Beaver Brook; Westbury Bog.

Iceland, (Greenland?), and Newf. to Alaska, southw. to Pa., Nebr., Colo., and Oreg.; rare or absent on the Atlantic Coastal Plain.

5. **H. dilatata** (Pursh) Gray.

Marly springy swamps; scarce. June 15–July 10.

Fir Tree Swamp between Slaterville and Dryden; Mud Creek, Freeville; Malloryville; McLean Bogs; Beaver Brook: Westbury Bog.

Lab. to Alaska, southw. to n. N. J., N. Y., and Oreg.; rare or absent on the Atlantic Coastal Plain.

6. **H. Hookeri Torr.**

Rich dry woodlands, in humus on gravelly neutral or slightly acid soil; frequent. June 15–July 15.

In deciduous woods, but frequent also under conifers: hillside s. e. of White Church; hilltops, North Spencer; pine woods near Lucifer Falls; Connecticut Hill; Cascadilla woods (*D.*); University Grove, formerly (*Dr. Jordan*); Fall Creek, below Varna; e. of Duck Lake. "A form approaching var. *oblongifolia*, occurs on Thacher's Pinnacle" (*D.*).

E. Que. and N. S. to Minn., southw. to Pa. and Iowa (?); rare or absent on the Coastal Plain.

7. **H. orbiculata** (Pursh) Torr.

In situations and soils similar to the preceding but only on the higher hills, usually under oak and chestnut or under conifers; infrequent. June 25–July.

Signer Woods (*D.*); North Spencer; hill w. of Dry Run, Spencer (*W. C. Muenscher & W. E. Manning*); woods on Taft Hill (*D.*); Richford; Dart Woods (*D.*); Rhodes Woods (*D.*); Ringwood.

Lab. to Alaska, southw. to Ga., Minn., and Wash.; rare or absent on the Atlantic Coastal Plain.

The spur and the lip vary in length, and the leaves in size, but the variations are not correlated. *H. macrophylla* Goldie seems to be merely the large-spurred extreme.

8. **H. ciliaris** (L.) R. Br. YELLOW FRINGED ORCHIS.

Sandy bogs, in acid soils; very rare.

Junius (*Sartwell*); Newton Ponds, base of sandy hill adjoining the moor at the eastern edge, collected in 1893 (*K. M. W.*) but not seen since.

Mass. and Vt. to Mich., southw. to Fla., Mo., and Tex.; more abundant on the Coastal Plain.

9. **H. blephariglottis** (Willd.) Torr. WHITE FRINGED ORCHIS.

In situations and soils similar to the preceding; rare. July 25–Aug.

Moor of Pout Pond bog (*Sartwell!*); bog e. of Duck Lake.

Newf. to Minn., southw. to Fla. and Miss.; more abundant on the Coastal Plain.

10. **H. lacera** (Michx.) R. Br. RAGGED ORCHIS.

Damp grassy fields and roadsides, mostly on slightly acid soils; infrequent. June 15–July.

S. e. of South Hill Marsh, several places (*D.*); n. e. of Hanshaw Corners; n. e. of Varna; s. slope of Turkey Hill; Ringwood; Freeville (*D.!*); Dryden-Lansing Swamp (*D.*); Lowery Ponds (*Sartwell*); Butler; near Mud Pond, Conquest.

Newf. to Minn., southw. to Ga., Ala. and Ark., including the Coastal Plain.

11. **H. psycodes** (L.) Sw. PURPLE FRINGED ORCHIS.

Wet meadows and the borders of swamps, in moderately heavy to medium light, slightly acid, soils; frequent. July 15–Aug. 15.

Near Summit Marsh; White Church (*D.*); Newfield, near the railroad station and w. of Key Hill; Cayuta Lake; Larch Meadow (*D.*); Buttermilk Glen (*D.*); Malloryville; near the McLean Bogs; Beaver Brook; Townley Swamp; Otter Lake; Spring Lake; Westbury Bog; and elsewhere.

Newf. to Minn., southw. to N. C. and Tenn., including the Coastal Plain.

12. **H. fimbriata** (Ait.) R. Br. PURPLE FRINGED ORCHIS.

In situations similar to the preceding but sometimes in drier soils; frequent. June 20–July, flowering considerably earlier than the preceding species.

Mossy hillside n. w. of North Spencer station; West Danby; Michigan Hollow; n. w. of Varna; Richford; Ellis Hollow; Ringwood; Malloryville Bog; McLean Bogs; Beaver Brook; and elsewhere; no records from the northern districts. Plants with pure white flowers in Michigan Hollow Swamp (*D.*).

Newf. to Ont. and N. Y. (Mich., *Small*), southw. in the mts. to N. C.; rare on the Coastal Plain.

4. Triphora Nutt.

1. **T. trianthophora** (Sw.) Rydb. (See Oakes Ames, Studies in the Family Orchidaceae, 7: 3. 1922. *Pogonia trianthophora* of Gray's Man., ed. 7. *P. pendula* of Cayuga Fl.)

Rich damp or dry woods, in nearly neutral leaf mold; rare. Aug.

Cascadilla woods, near the Old Armory, 1922 (*W. E. Manning*); Sheldrake Point, 1831 (*A. Gray*); Botrychium Woods, Spring Lake, 1916 (*L. Griscom, F. P. Metcalf, & A. H. Wright*); Westbury Bog, 1916 (same collectors). [Geneva (*Dr. J. Smith* in Sartwell Herb.).]

Me. to Wis., southw. to Fla., Mo., and Kans.; rare or absent on the Coastal Plain. A plant primarily of the rich humus of the interior.

The plant does not flower every year. Oakes Ames has called attention, apparently with justice, to the desirability of treating the members of the comprehensive genus Pogonia as three genera, thus following numerous other botanists. The distinguishing characters are rather too distinct even for those who prefer comprehensive genera.

5. Pogonia Juss.

1. **P. ophioglossoides** (L.) Ker.

Peat bogs, in acid soils; infrequent. June 20–July 20.

Larch Meadow (*D.*); Freeville (*D.*); Malloryville Bog (*D.*); McLean Bogs (*D.*); Chicago Bog (*D.*!); Miller Bog, Spring Lake; Featherbed Bog.

Newf. to Minn., southw. to Fla., Kans., and Tex. A characteristic plant on the Coastal Plain. Found also in Japan.

6. Isotria Raf.

1. **I. verticillata** (Willd.) Raf. (*Pogonia verticillata* of Gray's Man., ed. 7, and of Cayuga Fl.)

Damp woodlands and peat bogs, in more or less acid soils; rare. May 20–June 15.

Acid chestnut soils of the southern hills, and in sandy bogs on the Ontario plain: Caroline, in woods on top of Bald Hill, and w. slope of Taft Hill (*D.*); Danby, in woods on Ball Hill (*D.*); bog e. of Duck Lake (*L. Griscom, F. P. Metcalf, & A. H. Wright*!); Featherbed Bog (same collectors!).

Mass. to Wis., southw. to Fla., including the Coastal Plain and mostly confined to the region east of the Allegheny Mts. Thought by some botanists to be a calciphile.

7. Calopogon R. Br.[11]

1. **C. pulchellus** (Sw.) R. Br.

Peat and marl bogs, in somewhat acid soils; scarce. June 20–July 20.

Larch Meadow (*D.*); Freeville (*D.*); Woodwardia Bog; Malloryville Bog (*D.*!); McLean Bogs (*D.*!); Beaver Brook; marly moor, Lowery Ponds; Pout Pond bog; Miller Bog, Spring Lake; Featherbed Bog.

Newf. to Minn., southw. to Fla. and Mo. A characteristic plant on the Coastal Plain.

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[11] The name *Calopogon* is included in the *nomina conservanda* of the International Code.

8. Arethusa (Gronov.) L.

1. **A. bulbosa** L.

Peat bogs, in acid soils; rare. May 20–June.

Freeville Bog, 1874 (*E. H. Palmer*) and later (*D.*); Junius (*Sartwell*); Featherbed Bog (*L. Griscom, F. P. Metcalf, & A. H. Wright!*); Westbury Bog.

Newf. to Ont. and Minn., southw. to S. C. and Ind.; most common on the Coastal Plain.

9. Serapias L.

1. **S.** HELLEBORINE L.

Rich woodlands, in nearly neutral soils; scarce. July 15–Aug. 20.

Enfield Glen (*L. H. Bailey*); Six Mile Creek, several stations (several collectors); back of Sibley College (*S. H. Burnham*); McGowan Woods (*Burnham*), South Cortland, near Chicago Crossing (*E. L. Overholser*); Paine Creek; Botrychium Woods, Spring Lake (*L. Griscom, F. P. Metcalf, & A. H. Wright*); woods near Stark Pond (*L. H. MacDaniels*); near Westbury Bog (*Griscom & Metcalf*).

Que. to Ont., Mass., N. Y., and Pa.; probably adventive from Europe.

The species was first found here in 1916 and is apparently spreading. Unlike most adventive plants, it occurs usually in wild places that little suggest such introduction.

10. Spiranthes Richard[12]

a. Stem slender, leafless; leaves ovate, basal, fugacious; flowers 5 mm. long; raceme slender, often secund. 1. *S. gracilis*

a. Stem leafy, at least toward the base; leaves linear or lanceolate; flowers 5–12 mm. long; raceme thicker, not secund.

b. Lip quadrate, yellow, obtuse, with small oblong adnate marginal callosities at the base; flowering in June; leaves lanceolate, about 1 cm. wide. 2. *S. lucida*

b. Lip ovate-oblong, scarcely yellow, less obtuse, callosities globular or nipple-shaped and rarely wanting; leaves linear or linear-lanceolate.

c. Lip unconstricted; callosities prominent; lateral sepals not upturned, and therefore perianth not plainly ringent; beak of the stigma very long and slender; flowering in late summer. 3. *S. cernua*

c. Lip constricted below the apex, pandurate; callosities minute or lacking; lateral sepals upturned and connivent with the petals and the upper sepal; perianth ringent; beak of the stigma short; flowering in midsummer. 4. *S. Romanzoffiana*

1. **S. gracilis** (Bigel.) Beck. SLENDER LADIES' TRESSES.

Dry sandy or gravelly banks and thickets, in neutral or slightly acid soils; infrequent. July 15–Aug.

Chestnut soils of the hills s. of Ithaca, stony crests of ravines, along the Cayuga Lake shore, and in the sandy region n. of the lake: hilltop, North Spencer; Thatcher Pinnacles; Key Hill; Cascadilla woods (*D.*); Fall Creek woods (*D.*); Ringwood; between Renwick and McKinneys; sandy woods, Junius; "frequently with pines" (*D.*).

N. S. to Man., southw. to Fla., La., and Tex., including the Coastal Plain.

2. **S. lucida** (H. H. Eaton) Ames. (*S. latifolia* of Cayuga Fl. *S. plantaginea* of authors, not Lindley.) LADIES' TRESSES.

Springy places or along stream banks and lake shores, in alluvial, sandy or gravelly, neutral or more or less calcareous, soils; frequent. May 25–July 1.

White Church valley (*D.*); near West Danby (*D.*); Enfield Glen; Inlet Valley, near Lick Brook; upper Buttermilk Glen; Ringwood; McLean Bogs; marly springy

[12] The name *Spiranthes* is included in the list of *nomina conservanda* of the International Code.

bank, Little Salmon Creek; Paine Creek; shore of Utt Point; Big Gully Point; Savannah; e. of Mud Pond, Conquest; and elsewhere.

Me. to Wis., southw. to Va.; rare on the Coastal Plain.

3. **S. cernua** (L.) Richard. AUTUMN LADIES' TRESSES.

Springy open places, frequently in drier soil than the preceding, in the Cayuga Lake Basin in distinctly calcareous soils; not uncommon. Aug. 15–Sept.

Rare or absent in the chestnut soils of the basin, becoming more common in the Freeville and McLean district, and again less frequent n. of Cayuga Lake except in marl regions. Occurs abundantly in actual marl deposits along Fall Creek, and at Malloryville.

Newf. to Minn., southw. to Fla. and N. Mex., including the Coastal Plain.

The occurrence of this species on the Coastal Plain of N. J. suggests an affinity for acid soils, which is quite in contrast with the apparent soil preference here. This subject has been discussed by Wherry (Rhodora 23: 127. 1921), who considers the acid-loving form as true *S. cernua* whereas the plant of less acid (or calcareous?) soil is var. *ochroleuca* (Rydb.) Ames, which Ames can recognize only by its upland habitat and nonpolyembryonic seeds (Rhodora 23: 78. 1921).

4. **S. Romanzoffiana** Cham.

Marly bogs; scarce. July 10–Aug. 15.

Summit Marsh (*D.*); Brookton Springs (*D.*); Mud Creek, Freeville (*D.*); Mud Pond, McLean Bogs; Newton and Lowery Ponds (*D.!*).

Newf. to Alaska, southw. to Conn., N. Y., the Great Lakes, S. Dak., Colo., Utah, and Calif.; rare or absent on the Atlantic Coastal Plain. In certain parts of N. E. the plant apparently grows in more acid bogs.

11. **Epipactis** (Haller) Boehm.

a. Raceme loose; the saccate lip with elongated tip and flaring or recurved margin.
  b. Flowers in a 1-sided spike; anther short and blunt; beak of stigma shorter than the body; perianth 4–4.5 mm. long; leaves 1–3 cm. long; raceme 3–7 cm. long. 1. *E. repens*, var. *ophioides*
  b. Flowers in a loose spiral; anther acuminate; beak of stigma as long as or longer than the body; perianth 5–6 mm. long; leaves 3–8 cm. long; raceme 6–9 cm. long. 2. *E. tesselata*
a. Raceme rather densely flowered, scarcely 1-sided; lip scarcely saccate, elongated, with the margin involute; leaves and flowers larger than in the other species (see also 3d *a*).. [*E. decipiens*]
a. Raceme densely many-flowered, terete; lip strongly saccate, with a short blunt tip; margin not recurved nor flaring. 3. *E. pubescens*

1. **E. repens** (L.) Crantz, var. **ophioides** (Fernald) A. A. Eaton. (*Goodyera repens*, in part, of Cayuga Fl.) RATTLESNAKE PLANTAIN.

Dry or damp banks in hemlock woods, in slightly acid soils; rare. Aug.

Bank below sulphur springs, Enfield Glen, 1881 (C. U. Herb., collector unknown); hemlock woods, McLean Bogs, 1894 (*W. W. Rowlee*).

Newf. to Man. and Mont. (Alaska?), southw. to N. E., N. Y., and Mich., and in the mts. to S. C.; probably absent on the Coastal Plain.

2. **E. tesselata** (Lodd.) A. A. Eaton. (*Goodyera repens*, in part, of Cayuga Fl.) RATTLESNAKE PLANTAIN.

Moist or dry coniferous woods, in humus; rare. Aug.

N. w. corner of Michigan Hollow Swamp (*Miss L. B. Henderson*); coniferous woods above Lucifer Falls; near McLean Bogs, 1875 (*D?* in C. U. Herb.); perhaps elsewhere.

Newf. to Ont., southw. to Conn. and N. Y.

[E. **decipiens** (Hook.) Ames. (*Goodyera Menziesii* of Cayuga Fl., possibly.)

Woodlands about swamps; rare.

"Michigan Hollow, borders of the deep swamp; not in flower but leaves and buds evidently of this species. Dr. Gray obtained it in 'Western N. Y.'—it is believed from Seneca Co.,—in 1831" (*D.*). This plant has not been seen since the time of the foregoing record, and the determination is doubtful. It was probably a sterile plant of the preceding species.

E. Que. to B. C., southw. to N. S., N. B., n. Me., Lake Huron, and Ariz., also in Calif.; very rare in N. Y. State; rare or absent on the Atlantic Coastal Plain.]

3. **E. pubescens** (Willd.) A. A. Eaton. (*Goodyera pubescens* of Cayuga Fl.) RATTLESNAKE PLANTAIN.

Rich, slightly acid humus in dry, mostly coniferous woods; frequent. Aug.

Hillside, North Spencer; Enfield Glen; Cascadilla woods (*D.*); Fall Creek (*D.*), Ringwood; Malloryville; and elsewhere.

Me. to Minn., southw. to Fla. and Tenn., including the Coastal Plain.

12. Listera R. Br.

1. **L. australis** Lindl. TWAYBLADE.

Peat bogs, in sphagnum; rare. June.

Bog n. e. of Duck Lake, 1916 (*L. Griscom, F. P. Metcalf, & A. H. Wright!*); Featherbed Bog (same collectors!).

A plant of the Coastal Plain from N. J. to Fla. and La.; also in cent. and w. N. Y. and at Ottawa, Ont.

13. Corallorrhiza (Haller) Chat.

a. Lip with small lateral lobes, ovate, oval, or broadly oblong.
 b. Lip unspotted; lateral lobes minute, tooth-like; spur nearly obsolete; small plants of swamps, flowering in May. 1. *C. trifida*
 b. Lip spotted with purple; lateral lobes broad and rounded; spur manifest; larger plants of upland woods, flowering in summer. 2. *C. maculata*
a. Lip without lateral lobes, obovate or oval; spur nearly obsolete; small plants of damp woodlands, flowering in late summer. 3. *C. odontorhiza*

1. **C. trifida** Chat. (*C. innata* of Cayuga Fl.) SMALL CORALROOT.

Boggy or mucky woods in more or less calcareous regions, also more rarely in humus or in dry woods over less calcareous soils; scarce. May 10–June 10.

Michigan Hollow Swamp; swamp e. of Slaterville; Ellis Hollow Swamp (*D.!*); Dryden-Lansing Swamp (*D.*); borders of Mud Creek Swamp (*D.*); probably elsewhere in similar places.

Newf. to Alaska, southw. to n. N. J., Pa., Ohio, Mich., Minn., and Wash., and in the mts. to Ga.; absent on the Atlantic Coastal Plain.

2. **C. maculata** Raf. (*C. multiflora* of Cayuga Fl.) LARGE CORALROOT.

Humus of dry sandy or gravelly woodlands, sometimes in low moist woods, in neutral or slightly acid soils; frequent, and generally distributed. June 20–Aug.

This plant may grow in woods of either chestnut, maple, or beech, occurring in nearly all the dry woods w., s., and e. of Ithaca, and in the McLean district, but not in the heavier soils.

N. S. to B. C., southw. to Fla., Mo., N. Mex., and Calif.; frequent on the Atlantic Coastal Plain.

3. **C. odontorhiza** (Willd.) Nutt.

Damp sandy or gravelly chestnut woods, in slightly acid soils; rare. Aug.–Sept.

Richford, in chestnut woods, 1917 (*A. Gershoy*); Turkey Hill, 1921 (*A. H. Wright*); e. side of Phillips Pond, 1922 (*W. C. Muenscher & K. M. W.*).

S. Me. to Ont. and Mich., southw. to Fla. and Mo., including the Coastal Plain; rare northw.

14. **Microstylis** (Nutt.) Eaton

a. Pedicels equaling or shorter than the ovaries; lip acute, unlobed.
1. *M. monophyllos*

a. Pedicels slender, much longer than the ovaries; lip broad and truncate at apex, 3-lobed. 2. *M. unifolia*

1. **M. monophyllos** (L.) Lindl. ADDER'S MOUTH.

Boggy, mossy woods, rarely in ravines, in gravelly calcareous regions; scarce. June 15–July.

Caroline, low woods s. of depot; Headwaters Swamp (*A. H. Wright*); Michigan Hollow Swamp; springy brook on Thatcher Pinnacles (*D.*); w. of Key Hill; near Smith Corners n. of Cayuta Lake (*D.*); Cascadilla Glen (*D.*); Ellis Hollow Swamp (*D.*!); Ringwood; swamps near Freeville (*D.*!); Mud Creek, Freeville, frequent (*D.*!); Beaver Brook (*D.*); arbor vitae swamp e. of Clyde.

Que. to Man., southw. to Pa., Ind., and Nebr.; rare southw., and rare or absent on the Coastal Plain. Found also in Eurasia.

2. **M. unifolia** (Michx.) BSP. ADDER'S MOUTH.

In dry or wet humus over acid or neutral soils; rare. July.

Dry woods n. side of South Pinnacle, Caroline; dry open woods, hilltop w. of West Danby (*K. M. W., A. J. E., & L. F. Randolph*); boggy woods, Malloryville Bog; Grotto (*A. H. Wright*); swampy woods n. e. of Featherbed Bog (*L. Griscom, F. P. Metcalf, & A. H. Wright*).

Newf. to Man., southw. to Fla., Ala., and Mo.; rare on the Coastal Plain.

15. **Liparis** Richard

a. Lip equaling the petals, cuneate-obovate, translucent, madder purple, 10–12 mm. long. 1. *L. liliifolia*

a. Lip shorter than the petals, obovate or oblong, yellowish green, 5 mm. long.
2. *L. Loeselii*

1. **L. liliifolia** (L.) Richard.

On dry neutral or slightly acid mixtures of clay and sand, in open woodlands; very rare. June 20–July 20.

Near "Ovid, Seneca Co." (*Chickering & Brewer* in Sartwell Herb.), "a doubtful specimen" (*D.*); dry oak woods near the old street railway grade, Renwick slope, 1916 (*A. A. Allen*!).

N. H. and Mass. to Minn., southw. to Ala. and Mo.; infrequent on the Coastal Plain.

2. **L. Loeselii** (L.) Richard.

Neutral or slightly acid soils on calcareous bogs, meadows, and springy slopes; frequent. June–July 15.

Summit Marsh (*D.*); springy hillside, North Spencer; swamp w. of Key Hill; Cascadilla Creek; marl springs, Fall Creek above Forest Home; marsh between Fall Creek and the lake (*D.*); Ringwood (*D.*); Freeville (*D.*); springs near Mud Creek, Freeville (*D.*); Cayuga and Montezuma Marshes (*D.*); Junius marl ponds; Turtle Pond; Duck Lake; Westbury Bog.

N. S. to Sask., southw. to Ala. and Mo.; rare on the Coastal Plain.

16. **Aplectrum** (Nutt.) Torr.

1. **A. hyemale** (Muhl.) Torr. PUTTYROOT. ADAM-AND-EVE.

Rich, rather dry woodlands, in deep humus; scarce. June 1–20.

Enfield Glen; Inlet Valley, s. of Larch Meadow (*F. C. Curtice*); Six Mile Creek (*D.*); McGowan Woods (*D.*); woods near Varna (*H. L. Locke & C. S. Sheldon*); woods n. of Etna (*D.*); near Ludlowville (*H. B. Lord*); near Dryden-

Lansing Swamp (*D.* in C. U. Herb.); Ovid (*Brewer & Chickering* in Sartwell Herb.); Ledyard, 1827 (*J. J. Thomas*). *Sporadic in distribution; absent on the acid chestnut soils.*

Vt. to Sask. and Oreg., southw. to Ga., Mo., and Calif.; rare or absent on the Atlantic Coastal Plain. A plant of the rich soils of the interior.

CLASS II. DICOTYLEDONEAE

29. PIPERACEAE (PEPPER FAMILY)

1. Saururus (Plum.) L.

1. **S. cernuus** L. LIZARD'S TAIL.

Muddy swamps, brooks, and ditches; frequent. July 10–Aug.

Indian Spring marsh (*D.*!); w. side of Inlet Marshes; Warren farm, Forest Home; Dryden Lake valley (*D.*); Lake Como (Locke Pond, *D.*); w. of Canoga Marshes; near Clyde River, Galen; Howland Island; "abundant on the borders of Cayuga and Montezuma Marshes" (*D.*).

R. I. to Fla. along the coast, and from cent. N. Y. to Minn. and Tex.

A plant of the Coastal Plain and of the Great Lakes Basin, frequent on the Ontario plain of central N. Y., and, with the exception of the Dryden Lake and Lake Como stations, confined to the vicinity of Cayuga Lake. Traces of salt may be the influencing factor in the distribution of the plant.

30. SALICACEAE (WILLOW FAMILY)

a. Disk beneath each flower cup-shaped; stamens numerous; scales lacerate; leaves ovate or deltoid; winter-bud scales several. 1. POPULUS

a. *Disk consisting of 1–several finger-shaped or forked nectaries; stamens few; scales* entire or subentire; leaves lanceolate; winter-bud scale 1. 2. SALIX

1. Populus (Tourn.) L.

a. Styles dilated; scales glabrous or with a very few hairs; capsules 4–8 mm. in diam., subglobose or ellipsoid, maturing after the first leaves are mature; buds glutinous; leaf blades deltoid or ovate.

b. Petioles flattened.

c. Leaf blade mostly deltoid, often subcordate; teeth large and hooked, especially *at the leaf angles; petioles with 2 glands at upper end.* 1. *P. balsamifera*

c. Leaf blade rhombic or rhombic-deltoid; teeth small, more uniform, scarcely hooked; petioles without glands. 2. *P. nigra*, var. *italica*

b. Petioles terete or grooved.

c. Leaves ovate, glabrous or finely and sparsely pubescent, the base acute, rounded, or subcordate. 3. *P. tacamahacca*

c. Leaves broader, more rounded in outline, pubescent with coarser and usually longer hairs, the base more deeply cordate; teeth coarser. 4. *P. candicans*

a. Styles linear or filiform; scales silky; capsules 1–3 mm. in diam., narrowly conic, maturing with or before the first leaves; buds not glutinous or scarcely so; leaves ovate or rounded.

b. Petioles strongly flattened laterally; mature leaves glabrous; buds and one-year-old twigs not white-tomentose.

c. Leaves crenate-serrulate, glabrous when young; buds, twigs, young foliage, and capsules glabrous, often shining. 5. *P. tremuloides*

c. Leaves coarsely undulate-dentate, tomentose when young; buds, one-year-old twigs, and capsules puberulent or downy, dull. 6. *P. grandidentata*
b. Petioles terete or nearly so; mature leaves white-tomentose beneath; buds and one-year-old twigs white-tomentose. 7. *P. alba*

1. **P. balsamifera** L. (See Journ. Arnold Arb. 1:62. 1919. *P. deltoides* of Gray's Man., ed. 7. *P. monilifera* of Cayuga Fl.) COTTONWOOD. NECKLACE POPLAR.

Low alluvial fields, woods, and shores; common. Apr. 25–May 10.

Most abundant on the shores of Cayuga Lake, and in the valleys and ravines of the larger streams in the basin; occasional on the hillsides above the ravines, as in Six Mile and Cascadilla valleys.

W. Que. and N. H. to the Rocky Mts., southw. to Fla. and Tex.; rare or absent on the Coastal Plain.

Typical *P. balsamifera* has very large ovate leaves (12–15 cm. long, 10–12 cm. wide). The common form throughout the range has smaller, ovate-deltoid leaves and is separated from the typical form by Bailey and by Sargent as var. *virginiana* (Cast.) Sarg. This distinction seems doubtfully worthy of recognition.

The so-called "Carolina poplar," a tree commonly cultivated because of its rapid, luxuriant growth, is probably of hybrid origin, with *P. nigra* and *P. balsamifera* or *P. regenerata* as parents. It has been called *P. Eugenei* Simon-Louis and *P. canadensis* Moench, but the tree needs further study (see Bailey, Man. Cult. Pl., p. 226. 1924). This plant spreads from the roots along roadsides and in waste places. It differs from *P. balsamifera* in the following characters: leaf margin naked or sparsely pubescent, instead of finely ciliate toward base; serrations less coarse and less strongly uncinate; leaf base generally slightly convex instead of concave; leaf outline more rounded than deltoid, with a less acuminate apex; tree narrow-topped, and subcylindrical instead of widespread.

2. **P.** NIGRA L., var. ITALICA DuRoi. (*P. dilatata* of Cayuga Fl.) LOMBARDY POPLAR.

Roadsides and low grounds; occasional. Apr. 15–30.

Commonly cultivated, and occasionally spreading from the roots or by water-borne twigs: C. U. campus; near Spring St., Ithaca (*D.*); on the points along Cayuga Lake, as Myers Point (*D.*!), Lake Ridge Point (*D.*!), Willets (*D.*); and elsewhere.

This plant is said to be a staminate sport of *P. nigra* which arose in Lombardy early in the eighteenth century. It has since been spread over the world by cuttings.

3. **P. tacamahacca** Mill. (See Journ. Arnold Arb. 1:61. 1919. *P. balsamifera* of authors and of Cayuga Fl.) BALSAM POPLAR. TACAMAHAC.

Alluvial bottom lands and borders of swamps, or, along the southern limit of the species, in drier rocky soil; rare. Apr. 25–May 15.

Taughannock Gorge, in woods just n. e. of the falls (*D.*!), a group of small, slow-growing trees, apparently now much the same as thirty-nine years ago. These trees are "probably indigenous, resembling in habitat and appearance those seen at Niagara and elsewhere" (*D.*!). Other stations are: near Jacksonville, cultivated, probably from the Taughannock station; s. of Willets, probably introduced (*D.*); roadside and meadow near White Church (*D.*, also *A. J. E. & L. H. MacDaniels*).

Newf. and Lab. to Alaska, southw. across the continent, entering the U. S. only along its northern border; a tree distinctly of the Far North, reaching its extreme southern limit here. Along the southern boundary of its range it is a poorly developed tree.

The leaves are generally glabrous but occasionally puberulent on the petioles and veins beneath, such specimens being transitional to the var. *Michauxii* (Henry) Farwell, a northern variety not known in the Cayuga Lake Basin.

4. P. CANDICANS Ait. (*P. balsamifera*, var. *candicans*, of Cayuga Fl.) BALM OF GILEAD.

Roadsides and low grounds; infrequent. Apr. 25–May 5.

Occasionally spreading from cultivation: Mitchell St., Ithaca; near the East Ithaca railroad station; upper Cascadilla Creek; swampy woods n. e. of Mud Pond, McLean Bogs, spreading from a grove of large trees said to have been planted by the early settlers (*D.*!); along Fall Creek, n. of Freeville.

A much-cultivated tree of doubtful origin, probably a hyhrid from Europe. Only the pistillate form is known. It is often confused with *P. tacamahacca*, var. *Michauxii*, and perhaps also with pubescent forms of *P. tacamahacca* itself.

5. **P. tremuloides** Michx. AMERICAN ASPEN. TREMBLING POPLAR.

Gravelly, sandy, or stony, acid or neutral, soils; common. Mar. 25–Apr. 15.

Scarce about Ithaca; more common in the hills s. w., s., and s. e. of the city, along the cliffs of Cayuga Lake, and in the gravels of the McLean region.

Newf. and Lab. to Alaska, southw. to Tenn., Mo., and Nebr., including the Atlantic Coastal Plain, and through the western mts. to Mex. and Calif.

One of the most widely distributed of local trees, common in the North and extending almost or quite to the northern limit of tree growth.

6. **P. grandidentata** Michx. LARGE-TOOTHED ASPEN.

Dry light well-drained soil, chiefly on ravine crests and slopes, occurring in somewhat richer soils than the preceding; common. Apr. 10–30.

N. B. to Minn., southw. to Ill. and Iowa, including the northern Coastal Plain, and in the mts. to N. C. A tree strictly of the northeastern U. S. and of the Great Lakes district in Canada.

7. P. ALBA L. WHITE POPLAR. ABELE.

Chiefly light soils; occasional. Apr. 25–May 10.

In cultivation from Eurasia, and sometimes suckering freely in yards and along roadsides, thus becoming a troublesome weed.

2. **Salix** (Tourn.) L.

Key based on staminate flowers [13]

a. Nectaries 2 (often 3–4 in the first two species); scales pale or yellow, not dark-tipped; filaments hairy; catkins terminal on strongly leafy-bracted lateral branchlets.
  b Stamens more than 2 (nos. 7 and 8 sometimes fall in this group).
    c. Catkins slender (8–12 mm. in diam.), rather loosely flowered; twigs slender, more or less fragile near the base; trees.
      d. Nectary yellow, pale when dry. — 1. *S. nigra*
      d. Nectary red, blackish when dry. — 2. *S. amygdaloides*
    c. Catkins stout, thick (13–20 mm. in diam.), densely flowered; twigs stouter, tough at base; shrubs.
      d. Catkins 2–5 cm. long, flowering May 15–30. — 3. *S. lucida*
      d. Catkins 1–1.5 (2) cm. long, flowering June 10–30. — 4. *S. serissima*
  b. Stamens 2 (in nos. 7 and 8, sometimes 3 or 4).
    c. Filaments hairy through more than half their length; young leaves linear, sessile or nearly so; catkin-bearing branchlets 2.5–8 cm. long below the catkin at flowering time; low shrubs. — 5. *S. longifolia*
    c. Filaments hairy only at base; young leaves lanceolate or elliptical, petioled; catkin-bearing branchlets less than 2.5 cm. long at flowering time; trees.

[13] Varieties based chiefly on foliage are omitted. Only staminate catkins are referred to in this key.

d. Catkins 1.5–2 cm. long, recurved; twigs very slender, drooping. 6. *S. blanda*

d. Catkins 2–5 cm. long, not recurved; twigs stouter, sometimes flexuous but not drooping.

e. Young leaves glabrous, rarely sparsely pilose; twigs olive-green, very fragile at base. 7. *S. fragilis*

e. Young leaves silky pubescent; twigs tough or somewhat fragile at base.

f. Twigs green or brownish green. 8. *S. alba*

f. Twigs yellow or reddish yellow. 8a. *S. a.*, var. *vitellina*

a. Nectary 1; scales with pinkish, reddish, brownish, or black tips, not uniformly yellow or pale except sometimes in nos. 9 and 10; catkins either on leafy-bracted branchlets or nearly sessile; shrubs.

b. Filaments free or fused less than half their length, glabrous; catkins strictly alternate.

c. Scales uniformly pale, or with pink tips.

d. Flowering branchlets leafy, the leaves that develop below the catkins equaling or surpassing the catkins; young leaves early becoming glabrous; catkins not constricted at base; scales obovate or oblanceolate, sparsely hairy or glabrous; small shrubs of bogs. 9. *S. pedicellaris*

d. Flowering branchlets not really leafy, the 1–4 bracts less than half the length of the catkins; leaves pubescent; young catkins constricted at base; scales oblong or spatulate, hairy; large shrubs of low grounds. 10. *S. Bebbiana*

c. Scales with dark tips (dark red, brown, or black).

d. Anthers and nectary deep red (blackish when dry). 12. *S. candida*

d. Anthers and nectary yellowish or at least pale, or the anthers orange-red when young.

e. Catkins with some (often small) herbaceous bracts at the base, in flower as the leaf buds are opening.

f. Catkins 10–15 (18) mm. long; young foliage tawny- or rusty-silky; anthers (dry) 0.4–0.5 mm. long; hairs of the scales silky, hardly curled or matted; twigs tough at base. 13. *S. petiolaris*

f. Catkins (15) 18–28 mm. long; young foliage glabrous or white-hairy.

g. Anthers (dry) 0.4–0.5 mm. long; young foliage white-silky; hairs of the scales silky, hardly curled or matted; twigs brittle at base. 14. *S. sericea*

g. Anthers (dry) 0.6–0.8 mm. long; young foliage glabrous, or, if white-pubescent, hardly silky; hairs of the scales curly or matted, hardly silky; twigs tough at base. 11. *S. cordata*

e. Catkins without bracts at the base, in flower before the leaf buds begin to open.

f. Catkins 25–50 mm. long, not recurved; one-year-old twigs glabrous; large shrubs of wet places. 15. *S. discolor*

f. Catkins 10–25 mm. long, usually recurved; one-year-old twigs usually pubescent at the tips and the upper nodes; small shrubs of dry places. 16. *S. humilis*

b. Filaments fused nearly or quite to the anthers, pubescent; catkins often sub-opposite. 17. *S. purpurea*

Key based on pistillate flowers and fruit [14]

a. Scales pale or yellow, without dark tips, caducous; catkins terminal on leafy lateral branchlets.

[14] Varieties based chiefly on foliage are omitted. Only pistillate catkins are referred to in this key.

b. Stigma sessile or subsessile (style less than 0.5 mm. long or lacking); nectary yellow or greenish.
c. Ovary and capsule sessile or subsessile, glabrous; young leaves pubescent; trees.
d. Catkins 1.5–2 (2.5) cm. long, recurved; mature capsule 1–1.5 mm. long; twigs very slender, drooping. 6. *S. blanda*
d. Catkins (1.5) 2–6 cm. long, not recurved; mature capsule 2.5–4 mm. long; twigs stouter, sometimes flexuous but not drooping.
e. Twigs green or brownish green. 8. *S. alba*
e. Twigs yellow or reddish yellow, flexuous. 8a. *S. a.*, var. *vitellina*
c. Ovary and capsule distinctly pedicelled.
d. Ovary and capsule glabrous; leaves lanceolate, petioled, closely serrate; twigs fragile near base; trees. 1. *S. nigra*
d. Ovary and capsule villous, the capsule sometimes glabrous in age; leaves linear, sessile or subsessile, distinctly serrate; twigs tough at base; low shrubs. 5. *S. longifolia*
b. Style distinct, 0.5–1 mm. long; ovary and capsule glabrous, pedicelled.
c. Catkins slender, 4–7 mm. in diam. at flowering time, 1–1.8 cm. in diam. in fruit; twigs fragile at base; trees.
d. Nectary red, blackish when dry; capsule globose-conical, 4–4.5 mm. long; catkins very loose in fruit; one-year-old twigs very slender, 1–2.5 (3) mm. in diam. 2. *S. amygdaloides*
d. Nectary greenish, pale when dry; capsule subulate-conical, 5–6 mm. long; catkins not extremely loose in fruit; one-year-old twigs stouter, (2.5) 3–4 mm. in diam. 7. *S. fragilis*
c. Catkins stout, 8–14 mm. in diam. at flowering time, 2–2.5 cm. in diam. in fruit; twigs tough at base; nectaries greenish; shrubs.
d. Ovary and capsule rather abruptly contracted above the subovoid base; mature capsule 5–6.5 mm. long; plant in flower May 15–30, in fruit June–July. 3. *S. lucida*
d. Ovary and capsule subulate-conical, tapering uniformly from near the base; mature capsule 7–9 mm. long; plant in flower June 10–30, in fruit Aug.–Oct. 4. *S. serissima*
a. Scales with pinkish, reddish, brownish, or black tips, not uniformly yellow or pale except sometimes in nos. 9 and 10; chiefly persistent; catkins on leafy shoots or nearly sessile; style present or wanting; shrubs.
b. Ovary and capsule glabrous, pedicelled.
c. Scales pale; catkin-bearing branchlets leafy, 0.5–3 cm. long below the catkins; leaves bluish, acute or rarely obtuse. 9. *S. pedicellaris*
c. Scales black-tipped; catkins sessile or nearly so, subtended by a few leafy bracts; leaves green, acute or acuminate. 11. *S. cordata*
b. Ovary and capsule hairy.
c. Ovary 2 mm. long or more, distinctly pedicelled; capsule 3.5–15 mm. long; young foliage pubescent; leaves and catkins strictly alternate.
d. Catkins with some herbaceous bracts at the base, in flower as the leaf buds are opening.
e. Scales pale or pink-tipped, oblong or spatulate. 10. *S. Bebbiana*
e. Scales dark-tipped, oblanceolate or obovate.
f. Style deep red, 1–1.5 mm. long; nectary deep red; ovary and capsule white-woolly. 12. *S. candida*
f. Style pale, very short or even lacking; nectary pale or yellow; ovary and capsule silky or strigose (rarely glabrate).
g. Capsule pointed; catkins 10–15 mm. long; pedicel in fruit 1.5–3 mm. long. 13. *S. petiolaris*
g. Capsule very blunt; catkins 18–30 mm. long; pedicel in fruit 0.7–1.3 (1.8) mm. long. 14. *S. sericea*

d. Catkins without herbaceous bracts at the base, in flower before the leaf buds begin to open.
e. Catkins 25–50 mm. long, not recurved; ovary 3–4 mm. long; capsule 12–15 mm. long; large shrubs of wet places. 15. *S. discolor*
e. Catkins 10–25 mm. long, mostly recurved; ovary 2–3 mm. long; capsule 7–10 mm. long; low shrubs of dry soil. 16. *S. humilis*
c. Ovary 1.5 mm. long, sessile; capsule 2–3 mm. long; young foliage glabrous or glabrate, bluish green; leaves and catkins often subopposite; stigma sessile. 17. *S. purpurea*

Key based on mature foliage

a. Leaves entire, glabrous, often bluish green; apex obtuse, rounded, or barely acute (see also no. 16).
b. Leaves green beneath. 9. *S. pedicellaris*
b. Leaves glaucous beneath. 9a. *S. p.*, var. *hypoglauca*
a. Leaves toothed; apex subacute or acuminate.
b. Under surface of leaf more or less tomentose; upper surface more or less rugose.
c. Leaves elliptical or oblanceolate to obovate.
d. Blade 2–3 (3½) times as long as wide, the margin flat, the upper surface usually more or less pubescent. 10. *S. Bebbiana*
d. Blade 3–4 times as long as wide, the margin more or less revolute, the upper surface glabrous or glabrate. 16. *S. humilis*
c. Leaves narrowly oblanceolate to linear-lanceolate; margin revolute.
d. Upper surface of leaf hairy. 12. *S. candida*
d. Upper surface of leaf glabrous. 12a. *S. c.*, var. *denudata*
b. Under surface of leaf glabrous or silky; upper surface not distinctly rugose.
c. Leaves green or only slightly paler beneath, neither glaucous nor white-silky.
d. Leaves linear-lanceolate to linear, blade 8–20 times as long as broad.
e. Leaves tapering at base, sessile or subsessile; teeth distant, 2–4 per cm.; twigs tough; shrubs. 5. *S. longifolia*
e. Leaves rounded or obtuse at base, with a very short but distinct petiole; teeth close, 5–12 per cm.; twigs brittle at base; trees. 1. *S. nigra*
d. Leaves lanceolate to ovate; blade 2–7 times as long as broad; twigs not brittle.
e. Leaves, especially on the shoots, caudate-acuminate, lustrous.
f. Leaves and twigs glabrous. 3. *S. lucida*
f. Leaves and twigs with more or less sordid or rufous pubescence. 3a. *S. l.*, var. *intonsa*
e. Leaves merely acuminate.
f. Leaves narrow, 4–10 (14) mm. wide, acute or tapering at base; stipules lacking or ephemeral. 13. *S. petiolaris*
f. Leaves broader (12) 15–30 mm. wide, obtuse, rounded, or subcordate, rarely acute at base.
g. Leaves firm, lustrous; teeth very fine, (8) 10–20 per cm.; stipules early deciduous. 4. *S. serissima*
g. Leaves thinner, not lustrous; teeth coarser, 3–8 per cm.; stipules usually persistent. 11. *S. cordata*
c. Leaves much paler beneath, usually glaucous, sometimes white-silky.
d. Blade with serrations mostly lacking on lower third.
e. Leaves subopposite, cuneate-oblanceolate, bluish green; stipules early deciduous. 17. *S. purpurea*
e. Leaves strictly alternate, lanceolate, elliptical, or oblanceolate, not bluish green.
f. Leaves narrow, 4–10 (14) mm. wide; serrations sharp, minute, 6–15 per cm.; stipules early deciduous or obsolete. 13. *S. petiolaris*

f. Leaves broader, (15) 18–50 mm. wide; serrations subcrenate, uneven, 1–4 per cm.; stipules usually persistent.
g. Leaves glabrous beneath. 15. *S. discolor*
g. Leaves with tawny, silky hairs beneath. 15a. *S. d.*, var. *latifolia*
d. Blade serrate almost or quite to the base.
e. Leaves long-attenuate at apex, drooping; twigs slender; trees.
f. Leaves lanceolate with rounded base; margins crenate-serrate; teeth 7–12 per cm.; petioles slender, 10–30 mm. long. 2. *S. amygdaloides*
f. Leaves linear-lanceolate with acute or tapering base; margins sharply serrate; teeth coarser, 4–8 per cm.; petioles stouter, 3–10 mm. long. 6. *S. blanda*
e. Leaves acute or acuminate at apex, not long-attenuate, not drooping; twigs stouter.
f. Serrations coarse, 3–6 per cm., 0.4–1 mm. high; leaves rather firm, glabrous or nearly so; twigs fragile at base; trees. 7. *S. fragilis*
f. Serrations finer, 7–12 per cm., 0.1–0.4 mm. high; trees or shrubs.
g. Leaves firm in texture, scarcely blackening in drying, tapering at base; trees.
h. Pubescence of blade rusty-shining; twigs erect and rather stiff. (*S. alba*, var. *vitellina* × *S. lucida*)
h. Pubescence of blade white or ashy; twigs flexuous, and drooping or curving.
i. Leaves distinctly silky above; twigs greenish. 8. *S. alba*
i. Leaves subglabrous above; twigs yellowish. 8a. *S. a.*, var. *vitellina*
g. Leaves thinner, tending to blacken in drying, tapering or rounded at base; veins somewhat more prominent and less regular; twigs rather stiff, ascending.
h. Blade small, narrow, 4–10 (14) mm. wide; pubescence when present tawny or rusty; twigs generally fascicled toward ends of branches. 13. *S. petiolaris*
h. Blade usually larger and broader, (9) 10–30 mm. wide; twigs rarely conspicuously fascicled.
i. Leaves more or less white-silky beneath. 14. *S. sericea*
i. Leaves not silky. 11. *S. cordata*

1. **S. nigra** Marsh. BLACK WILLOW.

Low alluvial stream banks and shores; common. May 20–June 15.

Generally distributed; especially abundant about the head of Cayuga Lake and in the adjacent valleys.

N. B. to N. Dak., southw. to Fla. and Tex., including the Coastal Plain.

This species varies considerably in leaf outline, the form known as var. *falcata* (Pursh) Torr. being a narrow extreme; a form with long petioles occurs occasionally.

2. **S. amygdaloides** Anders. PEACH-LEAVED WILLOW.

In situations similar to the preceding, but often in drier soils; common. May 5–25.

Generally distributed throughout the basin; abundant in the Inlet Valley and around Cayuga Lake; rare on the hills, as at Ringwood and Caroline, and in the McLean region.

Cent. N. Y. and Ont. to B. C. and the Rocky Mts., southwestw. to Tex. and N. Mex. A tree primarily of the Central West, reaching its northeastern limit in this region.

A form with long, acuminate scales which sometimes equal or surpass the stamens is occasional in the Inlet Valley.

3. **S. lucida** Muhl. SHINING WILLOW.

Swamps and wet shores, sometimes in shallow water, apparently without soil preference; frequent. May 15–30.

Michigan Hollow; West Danby; Cascadilla Creek (*D.*); Renwick; Cayuga Lake shore (*D.*!); Dryden Lake valley (*D.*!); Malloryville Bog; Lake Como; McLean Bogs; Beaver Brook (*D.*!); Cayuga Marshes (*D.*); Spring Lake; and elsewhere.

Lab. to Alberta, southw. to N. J., Ky., and Nebr., including the northern Coastal Plain.

3a. **S. lucida** Muhl., var. **intonsa** Fernald.

In situations similar to the preceding; rare.

W. shore of Jennings Pond; bog, Ringwood (*A. Gershoy*). [Also at Long Lake, Tully, Onondaga Co.]

Newf. and Que. to w. N. Y.

4. ***S. serissima*** *(Bailey) Fernald.* (*S. lucida, var., no. 840 of Cayuga Fl.*) AUTUMN WILLOW.

Bogs and swamps, in calcareous regions; rare. June 10–30; fr. Aug.–Oct. 25.

McLean Bogs (*D.*!); Vandemark Pond (*A. J. E. & L. H. MacDaniels*); Lowery Ponds (*K. M. W., A. J. E., & L. F. Randolph*); Crusoe Lake (same collectors).

Newf. to Alberta, southw. to N. J., N. Y., and the Great Lakes; absent on the Coastal Plain. A northern plant of limy regions.

The fruit matures very late; good capsules, still unopened, have been obtained on Oct. 25 when the leaves were falling.

5. ***S. longifolia*** *Muhl.* SAND-BAR WILLOW.

Sandy shores or sandy alluvium; frequent. May 15–June 15.

On or near the shores of Cayuga Lake: Fall Creek, below Island Fall (*D.*); Renwick, s. of Stewart Park; n. of Esty Glen (*D.*!); Myers Point (*D.*!); Lake Ridge Point (*D.*!), and common for three miles northw.; n. of Atwaters; Lockwood Flats (*D.*); Farley Point (*D.*!); Canoga (*D.*).

E. Que. to Man., southw. in the interior to Va., Tenn., and Tex.; generally absent from N. E. and the Coastal Plain; approaching its eastern limit in the Cayuga Lake Basin.

Often flowering again in July and August, perhaps because of insect-gall injury.

6. **S.** BLANDA Anders. (See Bailey, Man. Cult. Pl., p. 225. 1924. Anderson in B. C. Prod. 16[2]: 212. 1868. Ascherson & Graebner, Synop. Mitteleu. Fl. 4: 213. 1908–13. *S. babylonica* of Cayuga Fl., possibly.) WISCONSIN WEEPING WILLOW.

Low grounds; occasional. Apr. 28–May 15.

Near Cayuga Lake: bank of Fall Creek, Renwick; Myers Point (*D.*!); Lake Ridge Point; and elsewhere.

Cultivated, and occasionally escaped.

Apparently both typical *S. babylonica* L., the weeping willow, and *S. blanda*, are in cultivation in the Cayuga Lake Basin. *S. babylonica*, however, is rare, owing to its lack of hardiness. All weeping willows found escaped seem to be *S. blanda*, a hybrid of *S. babylonica* and *S. fragilis*. This plant is distinguished from *S. babylonica* by its less strongly pendulous twigs, its broader leaves, its longer petioles and peduncles, and its longer-pedicelled capsules. Both staminate and pistillate plants are found.

7. **S.** FRAGILIS L. CRACK WILLOW.

Low grounds, shores, and moist roadsides; common. May 5–20.

Especially abundant about the head of Cayuga Lake, and along upper Six Mile Creek in the vicinity of Brookton; frequent elsewhere.

Naturalized from Eu. Hybridizes freely with *S. alba*.

8. **S.** ALBA L. WHITE WILLOW.

Low alluvial grounds and shores; *frequent.* May 5–20.

Rather common about Cayuga Lake: Renwick; Myers Point; Taughannock Point; Howland Point; rarely elsewhere, as at Brookton and Waterburg.

Naturalized from Eu.; much less common than the following variety.

8a. **S.** ALBA L., var. VITELLINA (L.) Koch. WHITE WILLOW.

Low grounds and roadsides; common. May 5–20.

Abundant on the flats at the head of Cayuga Lake, on the points about the lake, and in the valleys of all the larger streams of the basin.

Naturalized from Eu.

This willow hybridizes with *S. fragilis, S. amygdaloides,* and *S. lucida,* and probably with other species. Hybrids with *S. lucida* are common and generally distributed in central N. Y., and constitute a conspicuous element of the willow flora. They are *more or less shrub-like trees of luxuriant growth, with stout, erect, brilliantly yellow* twigs, and large, shining, yellow buds. The foliage is *vitellina*-like, though often *more glossy,* but the leaves have shining *tawny hairs beneath and often sparse ones* above; in forms along the shores of Cayuga Lake the under surface is often densely clothed with these brilliant hairs. "Both staminate and pistillate plants occur; and when in flower, the former are as striking as the best marked species of willow. Catkins are very abundant, bright yellow, 6–7 cm. long, and fill the air with their peculiar balsamic fragrance" (*D.*). These aments are very thick and dense, the stamens mostly 5, and the flowers often clustered, usually in 3's. The pistillate aments are more like those of *S. alba,* var. *vitellina.* The hybrid is apparently fertile to some extent. *S. alba,* var. *coerulea* (Smith) Koch, with glabrous leaves and green twigs, probably does not occur here.

9. **S. pedicellaris** Pursh. (*S. myrtilloides* of Cayuga Fl., in part, probably.)

Bogs, in more or less calcareous regions; rare. May 5–20.

Westbury Bog; Otter Lake. [Known also from Mendon and North Fair Haven.]

Que., Vt., N. Y., B. C., and Wash.

Apparently a rare shrub throughout its broad distribution, but seemingly frequent on the Ontario plain of western N. Y. The following variety is more common and widespread.

9a. **S. pedicellaris** Pursh, var. **hypoglauca** Fernald. (See Rhodora **11**: 161. 1909. *S. myrtilloides* of Cayuga Fl., in part.)

Bogs, often of a more acid nature than the preceding; rare. May 5–20.

Freeville, n. of village (*D.*!); Westbury Prairie; Junius (*Sartwell,* Herb. & Cat., and in Gray Herb.).

Newf. to B. C., southw. to N. J. (?), Pa., Ill., and Iowa; rather exceptional on the Atlantic Coastal Plain.

10. **S. Bebbiana** Sarg. (See Journ. Arnold Arb. 2: 68. 1920. Rhodora **26**: 122. 1924. *S. rostrata* of authors and of Cayuga Fl.)

Swampy and springy soils, less frequently on uplands, generally in acid soils; common. Apr. 20–May 15.

Especially abundant on the swampy hillsides s. and s. e. of Ithaca, and in the McLean region; less abundant in alluvial soils.

Newf. to Alaska, southw. to N. J., Nebr., and Utah; common on the northern Atlantic Coastal Plain.

11. **S. cordata** Muhl.

Low, chiefly alluvial, grounds and wet places; common. Apr. 20–May 10.

Newf. to B. C., southw. to Va., Mo., Colo., and Calif., including the Atlantic Coastal Plain.

The common shrub willow, variable in twigs and foliage and represented by the following varieties: (*a*) Twigs glabrous or nearly so, strongly ascending; stipules small or obsolete; leaf blades and petioles glabrous or subglabrous; young capsules generally green. (*b*) Twigs during the first season more or less densely crisp-pubescent, becoming glabrate in fall and winter except sometimes at the nodes, glossy the following spring, more spreading; stipules larger and more conspicuous; petioles and lower part of midrib beneath more or less crisp-pubescent; young capsules generally reddish brown. These two leading variations of *S. cordata* are about equally common. In the second variety the reversal of the quantity of pubescence from the first to the second season, with the twigs finally more glossy than in var. *a*, may cause confusion. Occasional hybrids occur between *S. cordata* and *S. sericea* (*S. subsericea* (Anders.) Schneid. See Laubholzkunde 1: 65. 1904. Rhodora 11: 9. 1909. Pl. Exsic. Gray., nos. 195 and 196. Probably not *S. myricoides* Muhl., judging from descriptions by early authors). The capsules in these hybrids are more or less hairy and the young leaves are usually somewhat silky.

12. **S. candida** Flügge. HOARY WILLOW.

Swamps and bogs, in calcareous regions; scarce. Apr. 25–May 10.

Fleming Meadow (*D.*!); Lake Como (Locke Pond, *D.*!); Junius marl ponds (*D.*); larch swamp s. w. of Savannah (*D.*); Spring Lake; Otter Lake; frequent on the Ontario plain.

Newf. and Lab. to Alberta, southw. to N. J., Pa., and Iowa; rare or absent on the Coastal Plain.

Hybrids of this species with *S. cordata* Muhl. occur at Fleming Meadow (see Bul. Torr. Bot. Club. 23: 194. 1896).

12a. **S. candida** Flügge, var. **denudata** Anders.

In habitats similar to the preceding; rare.

Fleming Meadow, 1894 (*K. M. W.*); arbor vitae swamp e. of Clyde; Crusoe Lake (*K. M. W., A. J. E., & L. F. Randolph*).

Newf. and Que., to N. Y. and Wis.

13. **S. petiolaris** Smith. (*S. petiolaris* of Cayuga Fl., in part.)

Boggy and swampy woods, showing no preference as to type of soil; infrequent. Apr. 15–May 15.

Summit Marsh (*D.* in C. U. Herb.); Michigan Hollow Swamp; Enfield Creek; Newfield; Woodwardia Bog; Lowery and Newton Ponds; Otter Lake; Westbury Prairie; Montezuma Marshes.

N. B. to N. Dak. and Man., southw. to n. N. J. and Tenn.; probably including the Coastal Plain at the north.

Occasional plants retain to some extent the silky pubescence of the young foliage.

According to Dudley, this species occurs in "low grounds and marshes" and is "frequent"; also such unusual habitats are given as the rather dry alluvial ground of the Fall Creek circus common. Much of Dudley's material, however, as shown by specimens in the C. U. Herbarium and by the stations cited, was *S. sericea* or hybrids of *S. sericea* with *S. cordata*.

14. **S. sericea** Marsh. SILKY WILLOW.

Swamps and low alluvial soils, showing no further preference as to type of soil; common. Apr. 20–May 10.

Abundant about the head of Cayuga Lake, in upper Six Mile Creek valley, and in the McLean region.

N. B. and N. S. to Mich., southw. to N. C., including the Coastal Plain.

Hybridizes freely with *S. cordata*.

15. **S. discolor** Muhl. PUSSY WILLOW. GLAUCOUS WILLOW.

Swamps, stream banks, and moist, chiefly gravelly, soil, either acid or neutral; common. Apr. 15–30.

Newf. to Man., southw. to Del. (and in the mts. to N. C.), Ill., and Mo., including the Coastal Plain.

15a. **S. discolor** *Muhl.*, var. **latifolia** *Anders.* (See Schneider, Journ. Arnold Arb. 2: 5. 1920. Var. *eriocephala* (Michx.) Anders.)

In situations similar to the preceding; rare. Apr. 15–30.

Boggy hillside n. of lower Coy Glen; Fall Creek (*D.* in C. U. Herb.); Renwick (*C. C. Thomas*).

Que. to Conn. and Ohio.

The characteristic very large fruiting aments of this variety are 10–15 cm. long and 2–3 cm. in diam.

16. **S. humilis** Marsh. PRAIRIE WILLOW.

Dry sterile acid or neutral soils; common. Apr. 15–30.

Especially abundant on the barren hilltops s. w., s., and s. e. of Ithaca; rare in the McLean region and in the richer soils.

Newf. to Minn., southw. to N. C., Tenn., and Kans.; common on the Coastal Plain.

17. **S.** PURPUREA L. PURPLE WILLOW. BASKET WILLOW.

Low grounds and shores; frequent. Apr. 20–May 10.

Inlet Valley, in Newfield and also s. of the Valley Cemetery; lighthouse road, Ithaca; Mud Creek, Freeville; Beaver Brook (*D.*); wet ledges above the falls, Taughannock Gorge; Venice (*D.*); frequent along the shore of Cayuga Lake from Esty Glen to Union Springs; large plants near Howland Point.

Escaped from cultivation where it was grown chiefly for basketwork. Native of Eu.

31. MYRICACEAE (SWEET GALE FAMILY)

1. Myrica L.

a. Leaves pinnatifid; bractlets of the ovary 8, linear, persistent; pistillate catkins globular, bur-like in fruit. 1. *M. asplenifolia*

a. Leaves serrate or subentire; bractlets of the ovary 2-4, scale-like, persistent or deciduous; pistillate catkins ovoid.

b. Leaves oblanceolate, averaging 7–15 mm. broad, appearing later than the flowers; twigs slender, blackish; bracts persistent; pistillate catkins becoming cone-like in fruit. 2. *M. Gale*, var. *subglabra*

b. Leaves elliptic-oblong or obovate, averaging 14–25 mm. broad, appearing nearly with the flowers; twigs stouter, brownish; bracts deciduous; fruits separate, coated with wax. 3. *M. carolinensis*

1. **M. asplenifolia** L. (*M. Comptonia* of Cayuga Fl.) SWEET FERN.

Sterile sandy, gravelly, or rocky, acid soils; occasional. Apr. 20–May 5.

Only on the higher hills in the southern and southwestern parts of the basin: North Spencer; Danby (*D.!*); hills on both sides of the White Church valley (*D.!*); Connecticut Hill (*A. L. Grant*).

N. B. to Sask., southw. to N. C., Tenn., Ind., and Mich.; common on the Coastal Plain.

2. **M. Gale** L., var. **subglabra** (Chev.) Fernald. (See Rhodora 16:187. 1914.) SWEET GALE.

Very wet boggy situations; rare. Apr. 20–May 5.

Only in the northern and northeastern parts of the basin: Lake Como (Locke Pond, *D.!*); Spring Lake; Savannah (*Sartwell*, Herb. & Cat.); Crusoe Prairie; Turtle Pond.

Lab. to Lake Huron, southw. to N. J. and Pa., especially on the northern Coastal Plain.

The local material is all of this variety, though the typical form occurs near by in Cortland Co. The soil factors influencing this species are not clearly understood. It is generally found here among acid-loving plants, but marl outcrops are near by. Its occurrence on the Ontario plain would suggest a saline influence.

3. **M. carolinensis** Mill. (*M. cerifera* of Cayuga Fl.) BAYBERRY. WAX MYRTLE.

Dry sterile sandy or gravelly acid soils, also in marl and peat bogs in sandy regions; rare. May 20–June 5.

Headwaters Swamp, 1921; moors of Newton, Lowery, and Vandemark Ponds (*Sartwell, D.!*), and on gravelly or sandy knolls near by; Pout Pond bog; Crusoe Prairie; Westbury Bog; arbor vitae swamp e. of Clyde.

P. E. I. and N. B., along the coast to Fla. and La.; also from cent. N. Y. to Lake Erie.

On the coast the species may be influenced more by saline conditions than by acid soils, and this may also be the reason for its occurrence in central N. Y.

32. JUGLANDACEAE (WALNUT FAMILY)

a. Fruit indehiscent; nut rough; staminate catkins stout, solitary or 2–3 together, sessile; stamens 10–40; pith of twigs diaphragmed. 1. JUGLANS

a. Fruit dehiscent; nut smooth, often angled; staminate catkins slender, in peduncled clusters; stamens 3–10; pith of twigs solid. 2. CARYA

1. Juglans L.

a. Fruit oblong, viscid; petioles and young twigs viscid-downy; terminal leaflet usually present; leaf scar with a downy pad at upper edge. 1. *J. cinerea*

a. Fruit globose, not viscid; petioles and young twigs puberulent or somewhat downy, not viscid; terminal leaflet rarely present; no downy pad above the leaf scar. 2. *J. nigra*

1. **J. cinerea** L. BUTTERNUT.

In rich, usually somewhat calcareous, soils, on either lowlands or hillsides; frequent. May 15–30.

Common in the ravines of the basin, especially in the Ithaca region.

N. B. to Minn., southw. to Ga., Ark., and Nebr.; rare or absent on the Coastal Plain and in granitic N. E.

2. **J.** NIGRA L. BLACK WALNUT.

In rich soils; occasional. May 15–30.

Along roadsides and in pastures, more frequent in the northwestern part of the basin but not clearly indigenous in cent. N. Y.

W. Mass. to Minn. and Nebr., southw. to Fla. and Tex. A plant primarily of the rich lands of the interior.

2. Carya Nutt.

a. Bark of trunk close, not exfoliating; husk of fruit thin, 0.5–2 mm. thick when dry, indehiscent or tardily dehiscent.

b. Leaflets 7–11, lanceolate; nut thin-shelled, very bitter; bud scales thick, irregular, and yellowish. 1. *C. cordiformis*

b. Leaflets (3) 5–7, oblong-lanceolate or broader; nut thick-shelled, sweet or only slightly bitter; bud scales thin, flat, gray-brown or darker. 2. *C. glabra*

a. *Bark of trunk exfoliating in strips or plates*; *husk of fruit readily splitting to the base*.
  b. Leaflets 5 (7), the lower pair much smaller than the others; nut rounded or barely pointed at base, whitish, 1.5–2.5 cm. long; twigs gray, or reddish brown.
    c. Nut not plainly ridged, globose or nearly so, ripe Sept.–Oct.; husk thin, 1–2.5 (3) mm. thick when dry; leaves glabrous or nearly so. 3. *C. ovalis*
    c. Nut ridged or angled, more or less flattened, ripe Oct.–Nov.; husk (3) 4–15 mm. thick when dry; leaves usually puberulent or downy beneath and on rhachis. 4. *C. ovata*
  b. Leaflets 7 (5–9), pubescent, the lower pair not very much smaller than the others; nut more plainly pointed at base, yellowish white, 2.5–5 cm. long; husk thick; twigs buff, or yellowish brown. 5. *C. laciniosa*

1. **C. cordiformis** (Wang.) K. Koch. (*C. amara* of Cayuga Fl.) BITTERNUT.

Rich woods and roadsides, in various soils, especially in the ravines; frequent. May 25–June 10.

Six Mile Creek (*D.*!); *near Renwick* (*D.*!); *Freeville and McLean* (*D.*!); *Cayuga Lake ravines* (*D.*!); *Crowbar Point* (*D.*); *Paine Creek*; *Aurora* (*D.*); Levanna (*D.*); and elsewhere.

N. E. and Que. to Minn., southw. to Fla. and Tex.; less frequent on the Coastal Plain.

2. **C. glabra** (Mill.) Sweet. (*C. porcina* of Cayuga Fl.) PIGNUT.

Dry heavy or medium soil, chiefly acid or neutral; common. May 20–June 15.

Cent. N. E. and Ont. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

3. **C. ovalis** (Wang.) Sargent. (See Bot. Gaz. **66**: 245. 1918. *C. microcarpa* Nutt. of Gray's Man., ed. 7, and of Cayuga Fl.)

In various soils, chiefly heavy; frequent, especially about Ithaca. May 15–June 10.

Eagle Hill and Snyder Hill (*D.*); C. U. campus (*D.*!); C. U. farm; Turkey Hill; Cayuga Lake shore; Canoga.

Cent. N. E. to Ont. and Iowa, southw. to Va., Ga. (?), Tenn., and Mo., including the Coastal Plain.

In the Cayuga Lake Basin this species appears much like a hybrid between *C. ovata* and *C. glabra*.

4. **C. ovata** (Mill.) K. Koch. (*C. alba* of Cayuga Fl.) SHAGBARK HICKORY.

In various soils, light or heavy, acid or neutral; common. May 15–June 10.

N. E. and Ont. to Minn., southw. to Fla. and Tex.; less frequent on the Coastal Plain.

5. **C. laciniosa** (Michx. f.) Loud. (*C. sulcata* of Cayuga Fl.) WESTERN SHAGBARK HICKORY.

Rich lowlands; rare. May 25–June 10.

Roadside below Ringwood, probably introduced; Ithaca-Slaterville road near the 6-mile post, probably introduced; borders of the Cayuga marshes, w. of Cayuga Bridge (*D.*); along the Seneca Canal three or four miles s. w. of Montezuma village; Clyde River, Galen; occasional in low woods at Junius (*D.*). [A fine stand in swamp at head of Owasco Lake.]

Cent. N. Y. and s. w. Ont. to Nebr., southw. to Pa., s. Ind., Tenn., and Okla. A plant of the alluvial soils of the Ohio and Mississippi Valleys, reaching its extreme northeastern limit in the Cayuga Lake Basin (see Dudley's *Cayuga Flora* for an extended account of this species).

33. BETULACEAE (BIRCH FAMILY)

a. Staminate flowers without a calyx, naked, 1 (or at least appearing to be 1) to each bract; pistillate flowers with a calyx; nut not winged, with involucrate bracts; fruiting inflorescence various.

b. Staminate flowers with two bractlets; pistillate flowers clustered in a scaly bud; nut large, with a conspicuous villous involucre; small shrubs. 1. CORYLUS

b. Staminate flowers with no bractlets; pistillate inflorescence raceme-like; nut small.

c. Staminate aments naked through the winter, mostly clustered; nut inclosed in the bladder-like bract; lowest large veins of the leaf usually forked; bark brown, flaky; trunk and branches terete; small trees. 2. OSTRYA

c. Staminate aments covered by bud scales during the winter, usually solitary; nut subtended by a large open leafy bract; lowest large veins of the leaf not forked; bark light blue-gray, close; trunk and branches fluted, sinewy; tall shrubs or small trees. 3. CARPINUS

a. Staminate flowers with a calyx, 2–6 to each bract; pistillate flowers without a calyx; nut winged or wingless, without an involucre; fruiting spikes cone-like.

b. Pistillate spike solitary; fruiting bracts deciduous with or soon after the nuts, thin, 3-lobed; nuts with a thin wing; stamens 2, bifid. 4. BETULA

b. Pistillate spikes racemose; fruiting bracts persistent, thick and woody, not lobed; nuts wingless or with a coriaceous margin; stamens 4, not bifid. 5. ALNUS

1. Corylus (Tourn.) L.

a. Sterile catkins distinctly peduncled, the scales spoon-shaped with a naked point and the bractlets exposed; involucre of the fruit short, spreading, exposing the top of the nut; twigs, especially at tip, and petioles glandular-bristly. 1. *C. americana*

a. Sterile catkins sessile or subsessile, the scales more arching with short-hairy points and the bractlets usually concealed; involucre of the fruit fused into a long tubular beak, much exceeding the nut; twigs and petioles not glandular-bristly. 2. *C. cornuta*

1. **C. americana** Walt. HAZELNUT.

Dry or well-drained, gravelly or sandy, acid or neutral, soils; frequent. Mar. 20–Apr. 20.

Chiefly in the Inlet Valley (*D.*!); hillside near Larch Meadow (*D.*!); near Coy Glen (*D.*); Six Mile Creek ravine (*D.* in C. U. Herb.); Cascadilla Glen (*D.*!); Fall Creek, near the rifle range and near the Warren woodlot; absent in the McLean region and in the richer soils of the northern part of the basin.

N. E. to Sask., southw. to Fla. and Kans.; common along the coast.

Forms approaching var. *missouriensis* DC. occur at the Fall Creek rifle range and on the Warren farm east of Forest Home.

2. **C. cornuta** Marsh. (*C. rostrata* Ait. of Gray's Man., ed. 7, and of Cayuga Fl.) BEAKED HAZELNUT.

More or less sterile acid or neutral soils, probably less sandy than the preceding; common. Mar. 20–Apr. 20.

Most frequent on the hills of the southern part of the basin (*D.*!); around the ravines (*D.*!); along Cayuga Lake (*D.*!).

Que. to B. C., southw. to Del., Mich., Kans., and Oreg., and in the mts. to Ga.; less abundant along the coast.

Marshall's name was four years earlier than Aiton's *C. rostrata*.

2. **Ostrya** (Michx.) Scop.

1. **O. virginiana** (Mill.) K. Koch. HOP HORNBEAM. IRONWOOD.

Gravelly well-drained acid or neutral soils; common. Apr. 25–May 15.

Most abundant on the ravine crests of the basin, along the cliffs of Cayuga Lake, and on the hillsides s. e. of Ithaca.

N. S. to Minn. and Nebr., southw. to Fla. and Tex.; not common along the coast.

3. **Carpinus** (Tourn.) L.

1. **C. caroliniana** Walt. HORNBEAM. BLUE OR WATER BEECH.

Moist or sometimes dry, gravelly or alluvial, acid or neutral, soils, in woods or ravines; common. Apr. 25–May 15.

N. S. to Ont. and Minn., southw. to Fla., Tex., and Kans.; less abundant on the coast.

4. **Betula** (Tourn.) L.

a. Fruiting spikes slender-cylindric, 6–8 mm. in diam., spreading or drooping on slender prominent peduncles; wing of fruit distinctly broader than body; leaves mostly with less than 8 pairs of prominent veins; bark white or whitish.

b. Twigs, petioles, and young leaves glabrous from the first; leaves (4–6 cm. long) glossy, ovate, broadly rounded or subtruncate at base, acuminate, doubly serrate with small apiculate but blunt teeth; petioles slender (0.5 mm. in diam.); twigs sparingly glandular, 1–1.8 mm. in diam.; fruiting catkins 6–9 mm. in diam. 1. *B. pendula*

b. Twigs, petioles, and often the young leaves, pubescent or puberulent, but often becoming glabrate; leaves usually dull, less acuminate, the teeth usually less irregular and more deltoid; twigs almost without glands.

c. Average leaves 4–6 cm. long, mostly rhombic with a cuneate base; veins ascending; petioles 0.6–0.8 mm. in diam.; twigs in the upper internodes 1.5 mm. in diam.; fruiting catkins 6–8 mm. in diam. [*B. alba*]

c. Average leaves 5–10 cm. long, ovate-oval with a rounded cordate or rarely slightly cuneate base; veins more spreading; petioles stouter, 0.8–1.2 mm. in diam.; fruiting catkins 8–12 mm. in diam., the scales with more conspicuous tips. 2. *B. papyrifera*

a. Fruiting spikes ovoid or short-cylindric, 10–20 mm. in diam., erect or suberect on short or obscure peduncles; wing of fruit not broader than body; leaves mostly with more than 8 pairs of prominent veins.

b. Bark dark, close or breaking into thick plates; bud scales and twigs strictly glabrous; scales of the fruiting spikes glabrous, thick and woody, not foliaceous. 3. *B. lenta*

b. Bark yellowish or gray, lustrous, exfoliating in thin sheets; bud scales, twigs at least at tips, and nodes puberulent, and with sparse long hairs; scales of the fruiting spikes pubescent, the tips subfoliaceous.

c. Scales of the fruiting spikes subcoriaceous, 5–8 mm. long; basal part 1–2.5 mm. long. 4. *B. lutea*

c. Scales of the fruiting spikes subfoliaceous, 8–13 mm. long; basal part 2.5–6 mm. long. 4a. *B. lutea*, var. *macrolepis*

1. **B. PENDULA** Roth. WHITE BIRCH.

Upland or damp lowland thickets; occasional. Apr. 20–May 20.

Knoll near D., L. & W. switchback, Six Mile Creek; Beebe Lake; Turkey Hill; woods n. of Cayuga Heights; Taughannock Gorge; Fox Ridge; s. end of Westbury Prairie; and elsewhere.

Native: Que. to Alaska, southw. to Me., Ill., and Man. Found also in Eurasia.

A circumpolar species of the Far North, coming south locally in the U. S. Many forms are in cultivation as ornamental trees, and escape occasionally to woods and thickets. At all the above stations the plant is unquestionably introduced. At Fox Ridge, where it forms a forest of several acres, it seems to have been planted or sown on previously cultivated ground. The cut-leaved forms of this species are var. *dalecarlica* Schneid. and var. *gracilis* Rehd. Apparently these forms have not escaped from cultivation. *B. pendula* differs from *B. populifolia* in the more rounded-ovate, less acuminate leaves, less glandular twigs, longer pistillate catkins with longer (3–5 mm.), less divaricate scales, and clustered staminate catkins. The New York State specimens of *B. pendula* have puberulent pistillate scales.

[**B.** ALBA L. WHITE BIRCH.

Occasionally planted, and occurring on roadsides adjacent to the white birch forest at Fox Ridge. Probably not spontaneous.

Native of Eu.]

2. **B. papyrifera** Marsh. PAPER, CANOE, OR WHITE BIRCH.

Acid or neutral well-drained soils; rare. May 15–30.

Not known to Dudley, but clearly native at the top of the high hill 1½ miles s. w. of West Danby, where it is abundant. It occurs also in considerable quantity just outside the Cayuga Lake Basin in the n. w. corner of Cayuta Township on the road from Ithaca to Elmira. A single small tree was found in a field, s. side of Fall Creek below Varna.

Newf. to Alaska, southw. to Pa., Nebr., and Wash., including the northern Atlantic Coastal Plain.

This species is doubtfully distinct from *B. alba* L., but in recent years has been more commonly so treated.

3. **B. lenta** L. BLACK OR SWEET BIRCH.

Rocky or gravelly well-drained acid or neutral soils; frequent. Apr. 30–May 20.

Common along the crests of the ravines of the basin, on the cliffs along the shores of Cayuga Lake, and on the hilltops s. w., s., and s. e. of Ithaca.

Newf. to Ont. and Iowa, southw. to Va., Tenn., and in the mts. to w. Fla.; rare on the Coastal Plain.

4. **B. lutea** Michx. f. (*B. alleghanensis* Britton.) YELLOW BIRCH.

Rich, usually moist, chiefly neutral soils; frequent. Apr. 30–May 20.

The species as a whole is most frequent in the ravines of the basin, in the deeper, cooler woods of the hilltops, and in the McLean region. The typical form is apparently frequent, as about Freeville Bog.

Newf. to Man., southw. to Del., Ill., and Minn., and along the mts. to N. C. and Tenn.; in the North, common on granitic and other soils.

4a. **B. lutea** Michx. f., var. **macrolepis** Fernald. (See Rhodora **24**: 170. 1922. *B. lutea* Britton.)

Probably of practically the same distribution as the preceding; perhaps less common. N. B. to Wis., southw. to Tenn., Ind., and Ill.

In this region there are almost too many intermediate individuals. The fruiting catkins are generally thicker than in the typical form.

5. **Alnus** (Tourn.) Hill

a. Leaves and maturing fertile cones not markedly glutinous (slightly so in no. 1); leaves serrate; shrubs.

b. Leaves obovate, acute or cuneate at base, finely and nearly evenly serrate, green beneath; axis of the general inflorescence nodding, but the individual pistillate clusters erect; bark dark dull gray, sparsely lenticellate. 1. *A. rugosa*

b. Leaves oval or elliptical, mostly rounded at base, serrate or dentate with the teeth serrulate, green or glaucous beneath; axis of the general inflorescence nodding, the individual pistillate clusters also nodding; bark more bronzy and lustrous, much more lenticellate. 2. *A. incana*

a. Leaves and maturing fertile cones strongly glutinous; leaves dentate with the teeth denticulate, green beneath; small trees. 3. *A. vulgaris*

1. **A. rugosa** (Ehrh.) Spreng. (*A. serrulata* of Cayuga Fl.) SMOOTH ALDER.

Shores and other wet places; scarce. Mar. 20–Apr. 20.

Only in the vicinity of Cayuta and Cayuga Lakes: w. shore of Cayuta Lake; lowlands along the shore at head of Cayuga Lake (*D.*!); Crowbar Point (*D.*); Taughannock Point; s. of Ludlowville station (*D.*!); Cayuga Marshes (*D.*!); Fox Ridge station.

Me. to Minn., southw. to Fla. and Tex. A plant primarily of the southeastern U. S., in its northern range restricted largely to the Coastal Plain and the basin of the Great Lakes and occurring only occasionally elsewhere.

This specific name is sometimes credited to Du Roi, but his was scarcely a valid publication.

2. **A. incana** (L.) Moench. SPECKLED ALDER.

Swamps; common. Mar. 20–Apr. 20.

Newf. to Sask., southw. to Pa., Iowa, and Nebr.; rare or absent on the Coastal Plain.

This species is very variable in the pubescence and glaucous character of the lower leaf-surface. Forms in which the latter is glaucous and glabrate or glabrous, except on the veins, are distinguished as var. *glauca* Ait.; those in which the lower leaf-surface is green and glabrate, as var. *hypochlora* Call. (See Rhodora **23**: 257. 1921.)

3. **A.** VULGARIS Hill. BLACK ALDER. EUROPEAN ALDER.

In cultivation, and spreading from the roots, as on C. U. campus and on the crest of Big Gully.

Introduced from Eu.

34. FAGACEAE (BEECH FAMILY)

a. Staminate flowers in a head on a drooping peduncle; nuts sharply triangular. 1. FAGUS

a. Staminate flowers in slender aments; nuts terete or flattened on one or two sides.

b. Pistillate flowers 2–4; fruit inclosed in a dehiscent prickly bur; staminate catkins dense, stiff, erect, 15–30 cm. long. 2. CASTANEA

b. Pistillate flowers solitary; fruit partly inclosed at base in a cup-shaped scaly involucre; staminate catkins distantly flowered, flexuous, drooping, 4–14 cm. long. 3. QUERCUS

1. Fagus (Tourn.) L.

1. **F. grandifolia** Ehrh. (*F. ferruginea* of Cayuga Fl.) BEECH.

Rich gravelly, calcareous or neutral, rarely acid, soils; common. May 10–June 1.

Abundant in the McLean region and locally on the hills e. and s. e. of Ithaca, and also locally abundant in some of the ravines, as in Six Mile Creek; elsewhere not a dominant forest tree.

N. B. to Ont. and Wis., southw. to Fla. and Tex.; less frequent on the Coastal Plain.

This species, with *Acer saccharum*, usually contrasts strongly in distribution with chestnut and oak, apparently preferring a fundamentally different soil.

2. **Castanea** (Tourn.) Hill

1. **C. dentata** (Marsh.) Borkh. (*C. vulgaris*, var. *americana*, of Cayuga Fl.) CHESTNUT.

Light well-drained acid or neutral soils; common. July 5–20.

Most abundant on the hills s. w., s., and s. e. of Ithaca; scarce in the richer soils of the northern part of the basin; absent in the McLean region.

S. Me. to Ont. and Mich., southw. to Ga., Miss., and Ark., including parts of the Coastal Plain.

One of the best and most accurate indicators of well-drained sandy or gravelly acid soil.

3. **Quercus** (Tourn.) L.

a. Fruit maturing the first season; leaves with the lobes or teeth blunt, or with bluntish mucronate tips, not bristle-tipped; styles wanting or nearly so; shell of the acorn glabrous on the inner surface.
  b. Leaves lyrate, or sinuate-pinnatifid, or somewhat irregularly lobed (sometimes shallowly lobed or merely toothed).
    c. Mature leaves glabrous beneath; scales of the cup not awned. 1. *Q. alba*
    c. Mature leaves pubescent or tomentose beneath; cup with awned scales. 2. *Q. macrocarpa*
  b. Leaves coarsely and regularly sinuate-dentate, or serrate (sometimes lobed in nos. 4 and 5), pubescent beneath.
    c. Leaves with rather sharply pointed teeth. 3. *Q. Muhlenbergii*
    c. Leaves with rounded or crenate teeth.
      d. Fruit sessile or very short-peduncled; scales of cup not awned. 4. *Q. montana*
      d. Fruit long-peduncled; upper scales of cup more or less awned. 5. *Q. bicolor*
a. Fruit maturing the second season; leaves with the lobes or teeth sharp and bristle-tipped; styles long and spreading; shell of the acorn tomentose on the inner surface.
  b. Lobes of leaf 4–6 on each side, broadest at base; length of largest lobes less than or equaling width of blade between bases of these lobes; acorn large, 2–3 cm. long; cup flat, saucer-shaped. 6. *Q. borealis*, var. *maxima*
  b. Lobes of leaf 2–4 on each side, oblong, or broader toward distal end; length of largest lobes generally 2–several times width of blade between bases of these lobes; acorn smaller, 1.2–2 cm. long; cup deeper, hemispherical or top-shaped.
    c. Upper scales of cup pubescent, loosely imbricated, somewhat squarrose when dry; sinuses between leaf lobes mostly becoming much wider distally; tomentum on under side of leaves tawny, more or less persistent or the leaves glabrescent; winter buds large, angular, tomentose. 7. *Q. velutina*
    c. Upper scales of cup glabrate, often glabrous and shining, closely appressed; sinuses between leaf lobes mostly of equal width throughout, or narrower distally; tomentum on under side of leaves whitish, early deciduous; winter buds small, rounded, nearly glabrous. 8. *Q. coccinea*

1. **Q. alba** L. WHITE OAK.

Soils of various types, neutral or acid; common. May 10–30.

Very rare in the calcareous gravels of the McLean district. In the Cayuga Lake Basin the species is apparently most abundant in the clays.

S. Me. to Ont. and Minn., southw. to Fla. and Tex., including the Coastal Plain.

2. **Q. macrocarpa** Michx. BUR OAK.

Rich, chiefly low, neutral or calcareous soils; frequent. May 15–June 1.

Summit Marsh (*D.*!); near Buttermilk Falls (*D.*); n. of Freeville (*D.*); McLean Bogs; s. e. of Judd Falls; Renwick; on the points along Cayuga Lake, becoming common at Farley Point and vicinity; common in upper Salmon Creek valley and vicinity; Cayuga Marshes (*D.*!).

N. S. to Man., southw. to w. Mass., Ga. (?), Tenn., and Tex. A species of the rich soils of the interior.

3. **Q. Muhlenbergii** Engelm. YELLOW OAK. CHESTNUT OAK.

Dry limy ledges or slopes; scarce. May 20–June 1.

Library slope, C. U. campus; s. of Sburger Glen (*D.*); Salmon Creek ravine, e. of Five Corners; Cayuga Lake cliffs, s. of Willets; Big Gully (*D.*!).

Vt. to Minn., southw. to Del., Ala., and Tex.; chiefly absent in the coastal region.

Dudley's specimens in the C. U. Herb. labeled *Q. prinoides* are *Q. Muhlenbergii.* These specimens came from the station near Willets given by Dudley for *Q. prinoides.* Since dwarf forms of the yellow oak still occur at this station, Dudley's inclusion of the shrubby species in the *Cayuga Flora* was undoubtedly an error. Moreover, *Q. prinoides* is a plant chiefly of the Coastal Plain, and not to be expected here.

4. **Q. montana** Willd. (See Rhodora **17**: 40. 1915. *Q. Prinus* of Gray's Man., ed 7, and of Cayuga Fl.) CHESTNUT OAK.

Dry neutral or acid, mostly rocky, soil; locally common. May 15–30.

Most common on the slopes and crests of the ravines, and on the tops and slopes of the higher hills in the southern part of the basin.

S. Me. to Ont., southw. in the mts. to Ga. and Tenn.; frequent on the Coastal Plain.

5. **Q. bicolor** Willd. SWAMP WHITE OAK.

Low or moist, chiefly alluvial, soils, apparently without lime preference; frequent. May 20–June 5.

N. of South Hill Marsh; Indian Spring marsh (*D.*!); low woods n. of Forest Home; McLean Bogs; Beaver Brook; on the points along Cayuga Lake, becoming common near Union Springs; near Genoa; Cayuga Marshes.

Me. and s. w. Que. to Ont. and Minn., southw. to Ga. and Ark.; less frequent on the Coastal Plain.

6. **Q. borealis** Michx. f., var. **maxima** (Marsh.) Sarg. (See Rhodora **18**: 48. 1916. *Q. rubra* of Gray's Man., ed. 7, and of Cayuga Fl.) RED OAK.

Various soils, both heavy and light, neutral and acid; common. May 15–25.

N. S. to Ont. and Minn., southw. to Ga., Mo., and Kans.; less frequent near the coast.

This species and *Q. alba* are more abundant on clay soils than are the other oaks.

7. **Q. velutina** Lam. (*Q. tinctoria* of Cayuga Fl.) NORTHERN BLACK OAK. DYER'S OAK. QUERCITRON.

Light acid or neutral soils; common. May 10–25.

S. Me. to Ont. and Minn., southw. to Fla. and Tex., including the Coastal Plain.

8. **Q. coccinea** Muench. SCARLET OAK.

Light acid soils; frequent. May 10–25.

South Hill (*D.*!); the Narrows, Six Mile Creek (*D.*); rather common along the crests of the ravines about Ithaca; near Pleasant Grove Cemetery (*D.*); Lake Ridge (*D.*); near Junius ponds (*D.*!).

S. Me. to Ont., Minn., and Nebr., southw. to N. C., Ill., (and Mo.?); most common eastw., and abundant on the Coastal Plain.

This and the preceding species are good indicators of acid sandy soils.

35. URTICACEAE (NETTLE FAMILY)

a. *Plant arborescent; ovule suspended.*
b. Flowers from special buds on wood of the preceding year, developing before the leaves; stamens erect in the bud; anthers extrorse; leaves serrate; fruit a flat samara. 1. ULMUS
b. Flowers on shoots of the season, developing mostly with the leaves; anthers introrse; fruit fleshy.
c. Flowers racemose, or the pistillate ones mostly solitary; stamens erect in the bud; leaves serrate. 2. CELTIS
c. Flowers, at least the pistillate ones, densely spicate or capitate; stamens inflexed in the bud.
d. Leaves entire, pinnately veined; staminate flowers in globose racemes. 3. MACLURA
d. Leaves dentate, often lobed, palmately veined; staminate flowers spicate. 4. MORUS
a. *Plant herbaceous; ovule suspended or erect.*
b. Leaves palmately 3–7-lobed or -divided; stamens erect in the bud; ovule suspended.
c. Leaves 5–7-divided, the divisions narrow; pistillate flowers forming an irregular spicate cluster; plant erect. 5. CANNABIS
c. Leaves 3–5-lobed, the divisions broad; pistillate flowers in definitely organized cone-like spikes; plant twining. 6. HUMULUS
b. Leaves not lobed; stamens inflexed in the bud; ovule erect; plant erect.
c. Calyx of the pistillate flowers of 2–5 separate or nearly separate sepals.
d. Leaves alternate, with stinging hairs; sepals of the staminate flowers 5, of the pistillate flowers 4; stigma long-subulate; achenes oblique, reflexed, naked. 7. LAPORTEA
d. Leaves opposite; sepals of the staminate and the pistillate flowers both 3–4; stigma capitate-tufted.
e. Plants with stinging hairs; achenes inclosed by the two inner and larger sepals; stems opaque. 8. URTICA
e. Plants without stinging hairs, glabrous; achenes naked or nearly so; stems translucent. 9. PILEA
c. Calyx of the pistillate flowers tubular or cup-shaped, 2–4-lobed, inclosing the achene; plant unarmed.
d. Leaves opposite, serrate; flowers glomerate, in interrupted axillary spikes which are sometimes leafy at the top, not involucrate; stigma long, filiform. 10. BOEHMERIA
d. Leaves alternate, entire; flowers in short axillary glomerules, involucrate; stigma tufted. 11. PARIETARIA

1. Ulmus (Tourn.) L.

a. Flowers slender-pedicelled, clustered or racemose, drooping; leaves smooth, or somewhat rough above; bud scales dark-margined.
b. Flowers subumbellate or corymbose; fruit notched at least halfway to the seed; branches not corky-winged; buds glabrous; petioles 5–10 mm. long; leaf blade elliptic-ovate, very oblique at base. 1. *U. americana*
b. Flowers racemose; fruit with a shallow notch; branches often corky-winged; buds pubescent; petioles 2–5 (8) mm. long; leaf blade elliptic-obovate, usually slightly oblique at base. 2. *U. racemosa*
a. Flowers short-pedicelled, in dense capitate clusters, not drooping; leaves scabrous, or rarely smooth above; bud scales uniformly dark.
b. Seed near the center of the large (17 mm. wide), shallowly notched, oval wing; leaf blade large, 8–18 cm. long; stamens 5–9; twigs rather stout; buds large.
c. *Twigs of the preceding season pale brown, scabrous-papillose; bud scales*

densely hairy even on the outer surface; leaves subcrenately toothed, sometimes 3-lobed at apex on sucker shoots; surface of fruit pubescent. 3. *U. fulva*

c. Twigs of the preceding season dark brown, slightly scabrous or smooth; buds less hairy, often glabrous outside; leaves sharply serrate, often 3-lobed toward apex; surface of fruit glabrous. 4. *U. glabra*

b. Seed near the apex of the smaller (12 mm. wide or less), orbicular wing, which is notched to the seed; leaf blade small, 5–8 cm long; stamens 3–5; twigs slender; buds smaller. [*U. campestris*]

1. **U. americana** L. AMERICAN ELM.

Alluvial bottom lands and on slopes and uplands, in calcareous gravels and in clays but rarely in light acid chestnut soils; common. Apr. 1–20.

Newf. to Man., southw. to Fla. and Tex.; in river valleys and swamps on the Coastal Plain.

Variable in habit. Two types may be recognized: the vase type, with strongly ascending main branches which toward the end are arched, recurved, and pendulous-tipped; and the oak type, with spreading, low-set, stiffer branches. The former type is often "feathered" with twigs on the trunk and the main branches. The vase type is the one used for street planting, and is the more common. Examples of the oak type occur on Turkey Hill and at Summit Marsh.

2. **U. racemosa** Thomas. (*U. Thomasi* Sarg.) CORK ELM. ROCK ELM.

Bottom lands and slopes, in rich calcareous gravel; frequent. May 1–10.

Dry Run, Spencer; Jennings Pond; Inlet Valley, near Lick Brook and Larch Meadow; Six Mile Creek ravine (*D.*!); Mud Creek, Freeville; "conspicuous east of McLean, as tall trees with short branches, thus presenting a columnar aspect" (*D.*!); McLean station (*D.*); Cayuga Lake shore (*D.*!); frequent on the plateau between Cayuga and Owasco Lakes; and elsewhere.

W. Que. and w. Vt. to Ont. and Minn., southw. to Ky. and Mo.; apparently absent in granitic N. E. and on the Coastal Plain.

The name *U. racemosa* is apparently valid under the International Rules.

3. **U. fulva** Michx. SLIPPERY ELM.

Slopes of ravines and stream banks, mostly in dry calcareous rocky or gravelly soils; frequent. Apr. 15–May 1.

Widely distributed throughout the basin except in the acid chestnut soils; especially abundant along the smaller ravines of the Cayuga Lake shore.

W. Que. and w. N. E. to N. Dak., southw. to Fla. and Tex.; rare on the Coastal Plain.

4. **U.** GLABRA Huds. (*U. scabra* Mill. *U. montana* With.) SCOTCH ELM.

Thickets and ravine banks; occasional. Apr. 25–May 10.

Escaped about Ithaca. Native of Eurasia.

Peculiar forms are found in cultivation, with smaller, smooth leaves. These may be hybrids with some other species.

[**U.** CAMPESTRIS L. ENGLISH ELM.

Frequently planted, but doubtfully spontaneous. Native of Eu.]

2. Celtis (Tourn.) L.

1. **C. occidentalis** L. HACKBERRY.

Slopes and bottom lands, in nonacid gravelly and often alluvial soils; infrequent. Apr. 25–May 15.

Inlet Valley, w. of Negundo Woods (*D.*!) and near mouth of Coy Glen; West

Hill (*D.*!); Fall Creek, below Ithaca Falls (*D.*); Renwick slope (*D.*!); near Percy Field; roadside s. of Esty, and foot of cliffs n. of Esty; also n. along Cayuga Lake shore; absent in the McLean region and on the chestnut soils in the basin.
Que. to Man., southw. to Ala. (?), Mo., and Okla, including the Coastal Plain.

3. **Maclura** Nutt.

1. **M.** POMIFERA (Raf.) Schneid. OSAGE ORANGE.
Hedgerows and thickets; rarely spontaneous. June.
Cultivated for hedges, and occasionally escaping as at Junius.
Native: s. Mo. to n. Tex.

4. **Morus** (Tourn.) L.

a. Leaves rough above, downy beneath; fruit dark purple or black, 2.5–3.5 cm. long. 1. *M. rubra*
a. Leaves smooth and usually shining; fruit whitish or black, 1–2 cm. long. 2. *M. alba*

1. **M. rubra** L. RED MULBERRY.
Ravines and hill slopes, in gravelly neutral soils; infrequent. May 20–June 10.
Danby and Enfield (*D.*); Coy Glen; Six Mile Creek, below Green Tree Falls (*D.*!); near the "Nook" (*D.*); Renwick slope (*D.*!); Beebe Lake; Salmon Creek (*D.*); Franklin Ravine (*D.*); Cayuga Lake cliffs, Ledyard; Paine Creek; Big Gully (*D.*!); not seen in Dryden and the McLean region (*D.*!).
Vt. to Mich. and S. Dak., southw. to Fla. and Tex.; infrequent on the Coastal Plain. A tree of the interior.

2. **M.** ALBA L.
Ravines and hill slopes; frequent. May 20–June 10.
Six Mile Creek, near D., L. & W. R. R. and near Ferris Brook (*D.*!); Beech Woods, Six Mile Creek; Cascadilla Creek, below Glen Pond (*D.*); Violet Island; road beyond the "Nook" (*D.*); e. of Percy Field; streets of Ithaca; C. U. campus; n. of Taughannock Gorge (*D.*); and elsewhere.
Escaped from cultivation, and now established. Native of Eu.
The commonest form here has dark purple or black fruit.

5. **Cannabis** (Tourn.) L.

1. **C.** SATIVA L. HEMP.
Garbage dumps and other waste places; infrequent. July–Aug.
Ithaca: dump near Dwyer Pond; near Cascadilla Place (*D.*); Six Mile Creek (*D.*!); dump on the lighthouse road; Forest Home (*D.*).
Springing up from scattered birdseed, but doubtfully spontaneous. Native of Asia.

6. **Humulus** L.

a. Pistillate spikes in fruit 15–25 mm. long, glandular-dotted; outer bracts very broad, short-acuminate, inner ones acute or obtuse; staminate panicle 5–15 cm. long; leaves 1–5- usually 3-lobed. 1. *H. Lupulus*
a. Pistillate spikes in fruit about 10 mm. long, not glandular; bracts narrow, long-acuminate, the large seed bulging out the bracts; staminate panicle large, 10–25 cm. long; leaves 5–7-lobed. 2. *H. japonicus*

1. **H. Lupulus** L. HOP.
River banks, fence rows, and in swamps; scarce. July.
Spencer Lake; White Church; near mouth of Coy Glen (*D.*); near Percy Field;

Forest Home Drive; island in Beebe Lake (*D.*); near Fall Creek, e. of Freeville (*D.*); "Round Marsh and several places in the interior of Beaver Creek Swamp, where *it is manifestly native*" (*D.*); McLean Bogs; South Cortland; thicket n. e. of Mud Pond, Conquest. Escaped from cultivation at many of the above-named stations.

N. S. to Man., southw. to N. Y., Pa., Ga., Fla. (?), Kans., Ariz., and N. Mex. Its indigenous range in the East is now obscure. Found also in Eurasia.

Plants from the above-named stations correspond mostly to *H. americanus* Nutt. as treated by Bailey (Man. Cult. Pl., p. 240. 1924), *but this is doubtfully a distinct* species.

2. **H.** JAPONICUS Sieb. & Zucc. JAPANESE HOP.

Escaped from cultivation to waste places; occasional. Sept.
Lumber yards, Six Mile Creek; edge of athletic field, C. U. campus.
Native of Japan.

7. Laportea Gaud.

1. **L. canadensis** (L.) Gaud. WOOD NETTLE.

Damp woodlands, in rich alluvial soils or humus; frequent. July–Aug.

Enfield Glen; Coy Glen; Six Mile Creek; Fall Creek; Renwick woods; McLean Bogs; Paine Creek; and elsewhere; absent on the heavy clays and on the light acid sandy soils of the basin.

N. B. and N. S. to Ont. and Minn., southw. to Fla. and Kans.; less frequent on the Coastal Plain. A plant of the rich inland country.

8. Urtica (Tourn.) L.

a. Leaves thin, ovate, coarsely and sharply toothed, the teeth spreading; blade and petiole setose-hispid; plant dioecious; inflorescence diffusely branched, more or less setose. 1. *U. dioica*

a. Leaves firm, ovate-lanceolate or lanceolate, less sharply and less divaricately toothed; blade not setose, petiole sparingly so or unarmed; plant usually monoecious, the upper verticels pistillate, the lower ones staminate; inflorescence less diffusely branched, not setose. 2. *U. gracilis*

1. **U.** DIOICA L. STINGING NETTLE.

A weed of roadsides and yards, in rich soil; scarce, but locally abundant. Aug.

Negundo Woods (*D.*); near road to Buttermilk Falls (*D.*); Six Mile Creek (*D.* in C. U. Herb.); Big Gully; low woods, Big Gully Point; abundant in farmyards and on roadsides near Barber Corners, Ledyard.

Newf. to Ont. and Minn., southw. to S. C., Mo., and Colo. Naturalized from Eu.

2. **U. gracilis** Ait. COMMON NETTLE.

Low grounds, damp roadsides, and waste places, in rich loamy soils; common. July–Aug.

Newf. to B. C., southw. to N. C., La., and Calif.; rare on the true Atlantic Coastal Plain soils.

9. Pilea Lindl.

1. **P. pumila** (L.) Gray. RICHWEED. CLEARWEED.

. Damp shaded gravelly or sandy soils, or on wet rocks in ravines, with no apparent relation to lime content of the soil; common. July–Sept.

N. B. to Ont. and Minn., southw. to Fla., La., Nebr., and Kans.; infrequent on the Coastal Plain.

10. Boehmeria Jacq.

a. Leaves broadly ovate, acuminate, smooth above or nearly so; petioles 20–40 mm. long. 1. *B. cylindrica*
a. Leaves narrowly ovate or ovate-lanceolate, acute or barely acuminate, in extreme forms reflexed, scabrous above; petioles 5–20 (30) mm. long. 1a. *B. c.*, var. *Drummondiana*

1. **B. cylindrica** (L.) Sw. FALSE NETTLE.

Swales and other wet places, over sandy or gravelly, mostly neutral, soils; frequent. July–Sept.

Fall Creek Gorge, below Forest Home; Girls' Playground, Cascadilla Glen; Renwick; McLean Bogs; Beaver Brook; Salmon Creek; Union Springs; Montezuma Marshes; Savannah; and elsewhere.

Me. to Ont. and Minn., southw. to Fla. and Tex.; infrequent on the Coastal Plain.

1a. **B. cylindrica** (L.) Sw., var. **Drummondiana** Wedd. (See Rhodora 12: 10. 1910. *B. c.*, var. *scabra* Porter.)

Very wet boggy borders of ponds and swales, in peat or marl bogs; scarce. June 20–Aug.

Marshy (calcareous) borders of Dryden Lake; marl moor of Vandemark Pond; floating moor of Slayton Pond; and probably elsewhere.

Mass. to N. Y., southw. to Fla. and Tex., including the Coastal Plain.

11. Parietaria (Tourn.) L.

1. **P. pennsylvanica** Muhl. PELLITORY.

Dry places on and beneath cliffs, more rarely on wooded banks, the type of soil not *understood; frequent. June–Aug.*

Enfield Glen; Coy Glen; Cascadilla Glen; Dwyer Pond; Fall Creek; bank at *mouth of McKinney Twin Glens; n. and s. of Esty Glen; and elsewhere.*

Coast of Me., and from Mass. and Vt. to Minn. and B. C., southw. to N. J., Fla., *Tenn., Nev., and Mex.; scattered stations on the Atlantic Coastal Plain.*

36. SANTALACEAE (SANDALWOOD FAMILY)

1. Comandra Nutt.

1. **C. umbellata** (L.) Nutt. BASTARD TOADFLAX. COMANDRA.

Dry woods; frequent. May 10–June.

Following the distribution of Vaccinium (and Ceanothus, *D.*); therefore on the chestnut soils of the higher hills w., s., and s. e. of Ithaca, on the ravine crests and the crests of Cayuga Lake cliffs, and in the sandy woods at Junius; absent in the McLean region and on the heavier soils back from the lake shore. Semi-parasitic on Vaccinium and other plants.

N. S. to Wis., southw. to Ga., Ark., and Kans., especially on the acid Coastal Plain but also in marl beds as at Bergen Swamp, N. Y.; found also in B. C. and Calif.

37. LORANTHACEAE (MISTLETOE FAMILY)

1. Arceuthobium Bieb.

1. **A. pusillum** Peck. DWARF MISTLETOE.

On *Picea mariana* (Mill.) BSP. in the Junius peat bogs, 1886 (C. U. Herb., collector unknown); fairly abundant in 1894 and 1904.

Newf. and Que. to Mich., southw. to Pa.

Produces "witches' brooms" on the parasitized trees. First segregated from Razoumofskya under the above generic name.

38. ARISTOLOCHIACEAE (BIRTHWORT FAMILY)

a. Plant acaulescent; perianth regular, persistent; stamens 12; anthers free from the stigma. 1. ASARUM
a. Plant caulescent, erect or twining, perianth irregular, tubular, deciduous; stamens 6; anthers adnate to the style or stigma. 2. ARISTOLOCHIA

1. Asarum (Tourn.) L.

a. Lobes of the calyx short-acuminate, mostly spreading. 1. *A. canadense*
a. Lobes of the calyx long-caudate-acuminate, mostly spreading. 1a. *A. c.*, var. *acuminatum*
a. Lobes of the calyx triangular, scarcely acuminate, short, strongly reflexed. 1b. *A. c.*, var. *reflexum*

1. **A. canadense** L. (*A. canadense*, in part, of Cayuga Fl.) WILD GINGER. CANADA SNAKEROOT.

Rich moist humus in upland woods, mostly overlaying calcareous gravels and rich loams; scarce. Apr.–May.

N. of Lick Brook; Taughannock Gorge; and probably elsewhere.

N. B. to Man., southw. to N. C., Mo., and Kans.; occurring only occasionally on the Coastal Plain.

1a. **A. canadense** L., var. **acuminatum** Ashe. (*A. canadense*, in part, of Cayuga Fl.)

In situations similar to the preceding; apparently much more common.

Enfield Glen; n. of Lick Brook; Six Mile Creek; Fall Creek; Taughannock Gorge; ravine near Elm Beach, Romulus; s. of Willets; Merrifield; and elsewhere.

Conn. and N. Y. to Minn. and Ky.; common westw.

In this flora this variety is scarcely more than an extreme of the typical form.

1b. **A. canadense** L., var. **reflexum** (Bickn.) Robins.

Alluvial woodlands; rare.

Howland Island, 1919 (*A. H. Wright*); alluvial wooded bank of Clyde River, Galen, 1923 (*L. F. Randolph, A. J. E., & K. M. W.*).

Conn. and s. N. Y. to Mich. and Iowa, southw. to Mo. and Kans.

2. Aristolochia (Tourn.) L.

1. **A.** CLEMATITIS L. BIRTHWORT.

Damp thickets on rich gravelly banks; rare. June.

Union Springs, on a bank s. e. of the railway station (*D.*!), probably escaped from cultivation. "First seen in 1874" (*D.*), it has since spread over a large area.

N. Y. to Md. Native of s. Eu.

39. POLYGONACEAE (BUCKWHEAT FAMILY)

a. Sepals 6, the three inner ones much enlarged in fruit (except in *Rumex Acetosella*); flowers greenish yellow, frequently tinged with red, wind-pollinated; stigmas tufted. 1. RUMEX
a. Sepals 4–5, nearly equal; flowers purple, pink, white, or greenish white, not wind-pollinated; stigmas not tufted.
  b. Leaves triangular-hastate; plant erect; embryo in center of endosperm; achene 3-angled; flowers white. [FAGOPYRUM]
  b. Leaves not triangular-hastate, or, if so, the stem climbing by prickles or twining; embryo curved around one side of endosperm; achene lenticular or 3-angled; flowers of various colors. 2. POLYGONUM

1. Rumex L.

a. Leaves neither sagittate nor hastate but occasionally cordate; flowers perfect or irregularly monoecious.
  b. Inner sepals crenate, denticulate, or entire.
    c. Grains of the fruiting calyx 0, or 1, or the rudiments of 3; sepals in fruit 5–6 mm. wide; (leaves undulate, sometimes crisped). 1. *R. Patientia*
    c. *Grains of the fruiting calyx 3; sepals in fruit 5 mm. wide or less.*
      d. Pedicels of nearly uniform thickness, not conspicuously reflexed.
        e. Pedicels jointed one-twentieth to one-tenth their length above the base; leaves lanceolate or linear-lanceolate, not crisped, subentire, pale green and glaucescent. 2. *R. mexicanus*
        e. Pedicels jointed one-fourth to one-third their length above the base; leaves lanceolate, oblong-lanceolate, or oblong, dark green, not glaucescent.
          f. Leaves very large, 5–10 cm. wide, finely erose, scarcely crisped; pedicels obscurely jointed; plant tall and coarse, 1–2 m. high. 3. *R. Britannica*
          f. Leaves smaller, less than 5 cm. wide, crenate and crisped; pedicels with tumid joints; plant 0.8–1.6 m. high. 4. *R. crispus*
      d. Pedicels gradually enlarged upward, jointed at the very base, conspicuously reflexed; leaves flat, lanceolate and subentire, slightly glaucous. 5. *R. verticillatus*
  b. Inner sepals spinulose-dentate or pinnatifid.
    c. Grains of the calyx 1; teeth not equaling the width of the sepal body; lower leaves oblong, the base truncate or cordate. 6. *R. obtusifolius*
    c. Grains of the calyx 3; teeth slender, about equaling the width of the sepal body; lower leaves lanceolate, the base acute. [*R. maritimus*]
a. *Leaves sagittate or hastate; flowers dioecious.*
  b. Sepals enlarged in fruit; plant 3–15 dm. high; leaves sagittate. 7. *R. Acetosa*
  b. Sepals not enlarged in fruit; plant 1–6 dm. high; leaves hastate. 8. *R. Acetosella*

1. **R.** PATIENTIA L. PATIENCE DOCK.

Roadsides and fields, in rich loamy soils; occasional. June–July.

Roadside near Coy Glen; Cayuga St., Giles St., and Ferris Place, Ithaca; Six Mile Creek (*D.*); Dryden; e. of Levanna; near West Junius (*D.*!).

Newf. to Ont. and Wis., southw. to Conn., Pa., and Kans. Naturalized from Eurasia.

Very conspicuous and handsome in fruit.

2. **R.** MEXICANUS Meisn. PALE DOCK.

Waste soil; rare. Aug.–Sept.

City dump, lighthouse road, Ithaca, 1921, and C. U. campus near Baker Court, 1921 (*S. H. Burnham & C. L. Wilson*).

Newf. and Lab. to B. C., southw. to Me., Mich., and Mo., and along the Rocky Mts. to Mex. Introduced in e. U. S.

3. **R. Britannica** L. GREAT WATER DOCK.

Marshes and swales, in rich alluvial or mucky soils, usually on a calcareous substratum; frequent, and locally abundant. Aug.–Sept.

Summit Marsh and Spencer Lake (*D.*!); near Caroline Depot; n. of Freeville; n. e. of McLean station; McLean Bogs (*D.*!); Dryden Lake (*D.*); Inlet Marshes (*D.*!); Cayuga Marshes; Botrychium Woods, Spring Lake; "very conspicuous on these [Cayuga Marshes] and Montezuma Marshes in autumn from its large plumes of pink fruit" (*D.*).

Newf. to Ont. and Minn., southw. to N. J. and Kans.; infrequent on the Coastal Plain.

4. **R.** CRISPUS L. YELLOW OR CURLY DOCK.

A weed of cultivated and waste ground, roadsides, and like situations, in rich, especially heavy, soils of various types; very common. June–Sept.

Almost throughout N. A. except in the extreme North; also in W. I. and Mex. Naturalized from Eu.

The grains vary from obtuse to acute, frequently on the same plant; hence the separation of those plants with more acute grains, as *R. elongatus* Guss., seems scarcely warranted.

5. **R. verticillatus** L. SWAMP DOCK.

Marshes and swales, in rich alluvial or lake-bottom soils; locally abundant. June–July.

Summit Marsh (*D.*); Inlet Marshes (*D.*!); Cayuga Marshes (*D.*!); around Salt Pond w. of Howland Island; and elsewhere (*D.*).

W. Que., Vt., and e. Mass. (?), to Iowa, southw. to Fla. and Tex.; apparently infrequent on the Coastal Plain.

A plant of the rich lands of the interior.

[**R.** CONGLOMERATUS Murr.

"Near the Marl Ponds, Cortland" (*D.*). Though carefully sought there, this species has not since been found. Judging from its range, its occurrence at Cortland is very doubtful.]

6. **R.** OBTUSIFOLIUS L. BITTER OR BROAD-LEAVED DOCK.

A weed of fields, roadsides, and waste places, in rather rich, moist, or shaded soils; not uncommon. July–Sept.

Newf. to B. C. and Oreg., southw. to Fla. and Tex. Naturalized from Eurasia.

Specimens from Dryden Lake, near Renwick, and by the roadside in Danby, which combine characters of this species and *R. crispus*, Dudley interprets as hybrids between these two species.

[**R.** MARITIMUS L. (See Rhodora 17: 80. 1915.)

This species, or some variety of it, was found in ballast in the L. V. R. R. yards at Ithaca in 1917, but has not been seen since. The material was young.]

7. **R.** ACETOSA L. GARDEN SORREL.

Fields and waste places; rare.

Roadside and adjoining field, n. slope of Connecticut Hill, abundant, 1924; one or two plants near the old Insectary (site of Baker Hall) previous to 1921.

Newf., Que., Vt., N. Y., and Pa. Introduced from Eurasia, but possibly native in the Far North and Northwest (Lab. to Alaska).

8. **R.** ACETOSELLA L. SHEEP SORREL. FIELD SORREL.

A weed of fields, roadsides, and waste places, in gravelly or sandy, rather sterile, soils; very common. May–Sept.

Throughout N. A. except in the extreme North. Naturalized from Eu.

[**Fagopyrum** (Tourn.) Gaertn.]

[**F.** ESCULENTUM Moench. BUCKWHEAT.

Roadsides, railroad embankments, and old fields; escaped from cultivation, and doubtfully established. June–Sept.

Native of Eu.]

2. **Polygonum** (Tourn.) L.

a. Stems not twining; leaves linear to ovate, not cordate but sometimes sagittate or hastate.
b. Stems not armed with prickles.
c. Flowers axillary.
d. Calyx in fruit 2–3.5 mm. long; margins whitish, or reddish white; plant usually prostrate; leaves acute, 6–30 mm. long; achenes dull.
1. *P. aviculare*
d. Calyx in fruit 3.5–5 mm. long; margins yellowish, or yellowish red; plant erect; leaves 15–60 mm. long.
e. Leaves broadly elliptical, obtuse or subacute; achenes dull.
2. *P. erectum*
e. Leaves narrowly elliptical or lanceolate; achenes glossy.
3. *P. ramosissimum*
c. Flowers in terminal spikes.
d. Styles short, soft, barely exserted, withering in fruit.
e. Sheaths not ciliate, except rarely the uppermost.
f. Spikes several; annual plants of damp rich soils.
g. Peduncles obscurely glandular or smooth; stamens 6.
h. Achenes 1.5–1.8 mm. wide; spikes slender, drooping, pinkish or purplish.
i. Leaves glabrous; plant tall. 4. *P. lapathifolium*
i. Leaves tomentose beneath; plant low. 4a. *P. lapathifolium*, var. *salicifolium*
h. Achenes (1.8) 1.9–2.5 mm. wide; spikes thicker, erect, greenish.
5. *P. scabrum*
g. Peduncles strongly glandular-pubescent; stamens 8; achenes 2.2–3.5 mm. wide; spikes thick, erect, pink.
h. Leaves copiously strigose beneath and often above; uppermost sheaths often ciliate; achenes 2.2–2.8 mm. wide.
6. *P. pennsylvanicum*
h. Leaves glabrous or sparingly strigose on the midrib beneath; sheaths usually not ciliate; achenes 2.5–3.5 mm. wide.
6a. *P. pennsylvanicum*, var. *laevigatum*
f. Spikes 1–2 (3); perennial aquatic or marsh plants, with long rootstocks rooting in the mud.
g. Leaves elliptical or narrowly oblong-lanceolate, obtuse or subacute; spikes oval-oblong, 1.3–2.5 cm. long; flowers bright pink.
7. *P. amphibium*
g. Leaves ovate-oblong or ovate-lanceolate, very acute or short-acuminate; spikes oblong-linear, 3–9 cm. long; flowers deeper pink.
8. *P. coccineum*
e. Sheaths ciliate with a row of bristles.
f. Sepals glandular-dotted.
g. Achenes dull; spikes strongly arched and nodding; flowers greenish; stems often reddish; internodes short, 2–4 cm. long; stamens 6.
9. *P. Hydropiper*
g. Achenes glossy; spikes erect or flexuous, not strongly nodding; flowers white, flesh color, or greenish white; stems green or greenish purple; internodes longer, 3–8 cm. long.
h. Plant perennial; stems decumbent and submerged at base, rooting at the nodes; spikes erect, rather dense, peduncled; flowers whitish or pinkish; stamens 8; achenes mostly 3-angled.
10. *P. robustius*

h. Plant annual from fibrous roots, not decumbent; spikes elongated, flexuous, very loosely flowered, the greenish white flowers scattered down to the upper leaf axils; stamens 3–8; achenes mostly lenticular. 11. *P. punctatum*

f. Sepals not glandular-dotted (or only very indistinctly so in no. 12).

g. Leaves lanceolate, 1–2 cm. wide; spikes erect; flowers 2–3 mm. long.

h. Plant conspicuously strigose; sheaths often with an herbaceous border; achenes lenticular. (See nos. 7 and 8.)

h. Plant sparingly strigose or glabrous; sheaths without a border.

i. Flowers clear white or pink; stamens 8; achenes triangular; leaf blades mostly rounded or obtuse at base; perennials of wet places. 12. *P. hydropiperoides*

i. Flowers dull pale greenish purple or greenish white; stamens 6; achenes lenticular or triangular; leaf blades acute at base, often with a dark spot near the middle; annuals of drier places. 13. *P. Persicaria*

g. Leaves broadly ovate, acuminate; spikes stout, deep purple, nodding; flowers 3–5 mm. long; sheaths often with a spreading herbaceous border; puberulent annuals. 14. *P. orientale*

d. Styles long, stiff, exserted, persistent, deflexed, and hooked at tip in fruit; spikes very long and slender, rigid, greenish; leaves ovate, acuminate. 15. *P. virginianum*

b. Stems armed with hooked prickles, reclining.

c. Leaves sagittate; styles 2; achenes lenticular. 16. *P. sagittatum*

c. Leaves hastate; styles 3; achenes 3-angled. 17. *P. arifolium*

a. Stems twining; leaves broadly ovate, cordate at base.

b. Nodes naked; angles of the calyx keeled; leaves glabrous, often scabrous on the veins beneath.

c. Calyx sharply angled; achenes dull; leaves triangular-ovate, the basal lobes acute; annuals. 18. *P. Convolvulus*

c. Calyx wing-angled; achenes glossy; leaves more heart-shaped in outline, the basal lobes more rounded; perennials. 19. *P. scandens*

b. Nodes bristly-ciliate; angles of the calyx obscurely keeled; leaves puberulent beneath; achenes glossy; perennials. [*P. cilinode*]

1. **P. aviculare** L. KNOTWEED.

A weed of roadsides and waste places, mostly in gravelly soils, also about salt springs; common. July–Oct.

Almost throughout N. A. Found also in Eurasia.

As a weed, introduced; but native about salt springs and elsewhere. Extremely variable in size of leaves, the forms with larger leaves being probably the var. *vegetum* Ledeb.; but too many transitional forms occur, and size of leaf seems to depend too much upon environment, to justify the recognition of the variety as a distinct race in the Cayuga Lake Basin.

2. **P. erectum** L.

A weed of rich roadsides, borders of fields, and waste places; frequent. Aug.–Oct.

Ont. to Alberta, southw. to Ga., Colo., and Tex.; infrequent or rare on the Coastal Plain.

3. P. RAMOSISSIMUM Michx.

A weed about the new Drill Hall, C. U. campus, 1916 and later. July.

Me. and Mass., local; w. Pa., and from Ill. to Minn., Tex., N. Mex., and Calif. Formerly unknown at this station, and undoubtedly introduced.

4. **P. lapathifolium** L. (*P. incarnatum* of Cayuga Fl.)

Damp gravelly stream banks and lake shores, in nonacid soils; not uncommon. July–Sept.

Coy Glen; along the Inlet; Inlet Marshes; Cayuga Lake shore; Fall Creek; Dryden Lake; Montezuma Marshes; and elsewhere.

Throughout temperate N. A., occurring sparingly on the Atlantic Coastal Plain. Found also in Eurasia. Possibly not native in N. A.

4a. **P. lapathifolium** L., var. **salicifolium** Sibth. (See Rhodora **23**: 259. 1921. *P. tomentosum*, var. *incanum*, of Gray's Man., ed. 7. *P. lapathifolium*, var. *incanum*, of Cayuga Fl.)

Low gravelly soil near the shores of the larger lakes; scarce.

Renwick (*K. M. W. & F. P. Metcalf*); "borders of Cayuga Marshes, 1858" (*Chickering & Brewer* in Gray Herb.); n. of Cayuga Marshes, 1918.

Range perhaps the same as for the typical form, of which it may be only a juvenile stage.

5. **P. scabrum** Moench. (See Rhodora **23**: 259. 1921. *P. tomentosum* of Gray's Man., ed. 7. *P. nodosum* of Cayuga Fl.)

Low gravelly or silty soils; locally abundant. Aug.–Sept.

Dryden Lake (*D.* in Gray Herb.); s. end of Cayuga Lake (*D.!*); Myers Point (*D.*); vicinity of Cayuga and on the Cayuga Marshes (*D.!*); abundant in 1919 in the bed of the abandoned canal at Cayuga.

Newf. to B. C., southw. to N. E. and Calif.; inland, mostly about the Great Lakes. Found also in Eu. Possibly not native in N. A.

6. **P. pennsylvanicum** L.

Moist, rich, open, gravelly or sandy, often alluvial, soils; rare. Aug.–Sept.

Bed of abandoned canal, Cayuga, 1919.

Coastal regions from N. S. to Miss., and northw. through the Mississippi Basin to s. Ont. and cent. N. Y.

6a. **P. pennsylvanicum** L., var. **laevigatum** Fernald. (See Rhodora **19**: 70. 1917.)

In situations similar to the preceding; common. Aug.–Sept.

N. S. to Ont. and Minn., southw. to Fla. and Tex.

7. **P. amphibium** L.

In shallow calcareous waters of ponds, usually over sandy or gravelly, more rarely mucky, bottoms; infrequent. July–Aug.

Spencer Lake, Summit Marsh (*D.!*), and stations between; Jennings Pond (*D.!*); Dryden Lake (*D.!*); region of Cortland marl ponds; Lake Como; Junius marl ponds; Cayuga and Montezuma Marshes (*D.*).

Newf. to Alaska, southw. to n. N. J., Ky., Colo., and Calif.; rare on the Atlantic Coastal Plain. Found also in Eu.

The typical aquatic form has floating glabrous subcoriaceous glossy leaves. The terrestrial forms have erect stems and more lanceolate membranous leaves which, together with the stems and sheaths, are strigose-hispid and not glossy. The sheaths may be without a foliaceous border [forma *terrestre* (Leers) Blake (*P. amphibium*, var. *terrestre* Leers, see Rhodora **15**: 164, 1913)], or with such a border [forma *Hartwrightii* (Gray) Blake (*P. Hartwrightii* Gray)]. As has been pointed out by Bissell (Rhodora **4**: 104. 1902), forma *Hartwrightii* is in many cases clearly an ecological terrestrial state of *P. amphibium*, springing from the same rootstocks as would the latter species if the plant were submerged. Whether it is always an ecological form is not certain, though this is probably the case. Forma *terrestre* has been found at Dryden Lake, Malloryville Bog, and the McLean Bogs; forma

Hartwrightii at Malloryville Bog, s. w. corner of Cayuga Lake, Lowery Ponds, and Salt Pond w. of Howland Island. House (Bul. N. Y. State Mus. 254) follows Greene in considering the American plants distinct from the European, and adopts the name *P. fluitans* Eaton for the American material. Stanford (Rhodora **27**: 125. 1925) holds the same view but recognizes *P. natans* Eaton as an older name than *P. fluitans* Eaton. The writers have had no opportunity to check this point.

8. **P. coccineum** Muhl. (See Rhodora **27**: 127. 1925. *P. Muhlenbergii* of Gray's Man., ed. 7, and of Cayuga Fl.)

Rich mucky marshes and ditches, frequently extending to gravelly or sandy situations; apparently not in strongly limy soils; frequent. Aug.–Sept.

Summit Marsh (*D.*!); Inlet Marshes and Cayuga Lake shore (here first noted by Dr. Gray in 1831, *D.*); "near Ludlowville Sta. and north to Lake Ridge Pt., where it is abundant" (*D.*); Ledyard, 1827 (*J. J. Thomas*); Union Springs (*D.*!); Canoga (*D.*); Montezuma Marshes.

Que. and Me. to B. C., southw. to Va., La., Calif., and Mex.; found sparingly on the Atlantic Coastal Plain.

An ecological form of this species corresponding to the aquatic form of *P. amphibium* is forma *natans* (Wiegand) Stanford (see Rhodora **26**: 3, 1924, and **27**: 152, 164, 1925). It has floating stems, and floating, glabrous, thicker, and more glossy leaves. It can usually be distinguished from *P. amphibium* by the more acute leaves, the longer spikes (3–9 cm. long), and the deeper pink color of the flowers. This variant has been found in the Inlet and Montezuma Marshes, and transitional specimens were collected in the small pond west of Fleming Meadow.

9. **P. Hydropiper** L. SMARTWEED. WATER PEPPER.

Swales, meadows, and damp pasture lands, mostly in exsiccated ground but in various soils with no apparent relation to lime content; common. Aug.–Sept.

Almost throughout N. A., except in the extreme North; possibly introduced in the Cayuga Lake Basin. Found also in Eu.

10. **P. robustius** (Small) Fernald. (See Rhodora **23**: 147. 1921. *P. acre*, in part, of Cayuga Fl. and of Gray's Man., ed. 7.)

In the shallow water of swales; rare. Aug.–Sept.

A plant of the larger marshes and swales: Inlet Marshes, 1874 (without collector's name); near the Clyde River 1½ miles n. w. of Marengo (*A. J. E., K. M. W., & L. F. Randolph*); road, Clyde to Savannah (same collectors). [Cortland mill pond.]

N. S. to R. I., N. Y., Mo., and southw. Exact range not clear, but chiefly a plant of the Coastal Plain.

11. **P. punctatum** Ell. (*P. acre*, in part, of Cayuga Fl. *P. acre*, var. *leptostachyum*, of Gray's Man., ed. 7.) WATER SMARTWEED.

Marshy or boggy places, often in water, in various soils with little reference to lime content; frequent. Aug.–Sept.

Spencer Lake; Renwick woods and vicinity; Dryden Lake; Beaver Brook; Chicago Bog; Cortland marl ponds; abandoned canal, Cayuga; moor of Lowery Ponds; and elsewhere.

Almost throughout N. A., except in the extreme North, including the Atlantic Coastal Plain.

The characters given in the key seem sufficient to warrant the recognition of this as a distinct species, as has been done by Fernald. *P. punctatum* Ell. is an earlier name than *P. acre* HBK.

12. **P. hydropiperoides** Michx. MILD WATER PEPPER.

Wet places and shallow water, mostly in sandy or gravelly swales along streams and about lake shores, with little or no relation to lime content; infrequent. Aug.–Sept.

Summit Marsh (*D.*); marshes along Cayuga St., Ithaca (*D.*); Fall Creek, between *Forest Home and Varna* (*D.*!); Crane Creek, Montezuma. (*More common in* Cortland Co.)

N. S. to Minn. and Calif., southw. to Fla. and Mex.; less common on the Atlantic Coastal Plain.

In the Cayuga Lake Basin the plant passes insensibly to var. *strigosum* Small, with strigose stems and leaves. A related species, *P. setaceum* Baldw., has been found in Oswego Co. and should be sought on the Ontario plain in this flora.

13. **P.** PERSICARIA L. LADY'S THUMB. HEARTWEED.

A weed of roadsides, waste places, and cultivated ground, but showing little relation to type of soil though perhaps best developed in the richer loamy soils; very common. July–Sept.

Throughout N. A., except in the extreme North. Naturalized from Eu.

Dudley distinguished two additional forms: a smooth prostrate form, and a hairy branched form with interrupted spikes. Specimens from Dudley in the Gray Herbarium show that his first form was *P. hydropiperoides* Michx., var. *strigosum* Small, and the second form was *P. scabrum* Moench.

14. **P.** ORIENTALE L. PRINCE'S FEATHER.

A weed on garbage dumps and sandy or gravelly waste places; occasional. Aug.–Sept.

City garbage dump along the lighthouse road, Ithaca; gravelly shore, s. w. corner of Cayuga Lake; near East Ithaca; and possibly elsewhere.

Escaped from cultivation. Native of India.

15. **P. virginianum** L.

Rich alluvial woodlands, chiefly in the valleys of the larger lakes; frequent. Aug.–Sept.

Spencer Lake; bank beyond Fleming Schoolhouse (*D.*); Negundo Woods (*D.*!); Coy Glen; Beech Woods, Six Mile Creek; near Indian Spring (*D.*); Renwick woods, and w. of the Inlet; Renwick slope (*D.*); McGowan Woods; along Fall Creek, *Ithaca to Etna; Freeville; Paine Creek; sand along Clyde River n. w. of* Marengo.

N. H. to Ont. and Minn., southw. to Fla. and Tex.; infrequent on the Coastal Plain.

16. **P. sagittatum** L. ARROW-LEAVED TEARTHUMB.

Low *grounds, in somewhat mucky, sandy, calcareous or noncalcareous, soils*; very common. Aug.–Sept.

Newf. to Alberta, southw. to Fla. and Kans., including the Coastal Plain.

The flowers are either white or strongly tinged with purple.

17. **P. arifolium** L. HALBERD-LEAVED TEARTHUMB.

Low woods, in rich black silty or sandy acid or neutral soils; infrequent. Aug.–Sept.

Summit Marsh (*D.*); Headwaters Swamp; Slaterville Swamp; Jennings Pond; Renwick woods and marshes (*D.*!); near Larch Meadow; Ringwood (*D.*!); Fir Tree Swamp, Freeville; near Freeville (*D.*); McLean Bogs; Ledyard, 1827 (*J. J. Thomas*); Cayuga Marshes (*D.*!); near Duck Lake; and elsewhere.

N. B. to Ont., southw. to Ga., Ohio, and Mich., including the Coastal Plain.

18. **P.** CONVOLVULUS L. BLACK BINDWEED.

A weed of cultivated grounds and waste places, mostly in gravelly soils; common. July–Oct.

Nearly throughout N. A., except in the extreme North. Naturalized from Eu.

19. **P. scandens** L. (*P. dumetorum* and var. *scandens* of Cayuga Fl.) CLIMBING FALSE BUCKWHEAT.

Low thickets, in alluvial sandy or gravelly soil; frequent. Aug.–Sept.
Coy Glen; Inlet Valley; Renwick woods and vicinity; and elsewhere.
N. S. to Ont. and B. C., southw. to Fla., Nebr., and Tex., including the Atlantic Coastal Plain.

[**P. cilinode** Michx.

This plant is frequent in Cortland Co., and is to be expected along the eastern and southern borders of the Cayuga Lake Basin.]

40. CHENOPODIACEAE (GOOSEFOOT FAMILY)

a. Leaves linear or broader, not spiny nor scale-like, alternate; embryo coiled into a ring about the copious endosperm.
  b. Flowers perfect, not inclosed between special bracts.
    c. Sepals each with a dorsal wing-like projection; leaves narrowly lanceolate to linear. [KOCHIA]
    c. Sepals naked; leaves lanceolate to ovate. 1. CHENOPODIUM
  b. Flowers unisexual, the pistillate ones without a perianth and inclosed between two triangular bracts; leaves lanceolate to hastate-ovate. 2. ATRIPLEX
a. Leaves scale-like, opposite; branches terete, succulent, jointed; embryo curved or conduplicate; endosperm wanting (see also 3d *a*). 3. SALICORNIA
a. Leaves subulate, spiny-tipped, alternate; embryo spirally and conically coiled; endosperm wanting. 4. SALSOLA

[**Kochia** Roth]

a. Leaves linear-lanceolate, 3–7 mm. wide; plant diffusely branched, apparently green in autumn. [*K. scoparia*]
a. Leaves narrowly linear, 1–2 mm. wide; plant densely fastigiate, bright red in autumn. [*K. scoparia*, var. *trichophila*]

[**K.** SCOPARIA (L.) Schrad.

In cinders near the heating plant, Agricultural College, Ithaca, 1923 (*S. H. Burnham*); probably not established. Adventive from Eurasia.]

[**K.** SCOPARIA (L.) Schrad., var. TRICHOPHILA (Schinz & Thell.) Bailey. (See Bailey, Man. Cult. Pl., p. 250. 1924.)

Garbage dump at Dwyer Pond; Dryden Road, Ithaca; lighthouse road, Ithaca; probably not established.
Escaped from cultivation. Native of Eurasia.]

1. **Chenopodium** (Tourn.) L.

a. Foliage glandular; embryo forming an incomplete ring.
  b. Flowers atomiferous; panicle broad; leaves 4–18 cm. long, lanceolate, coarsely toothed; plant tall. 1. *C. ambrosioides*
  b. Flowers strongly glandular-pubescent; panicle narrow, the branches subsecund; leaves 1–5 cm. long, pinnately lobed; plant low. 2. *C. Botrys*
a. Foliage not glandular, often mealy; embryo forming a complete ring.
  b. Seeds vertical, or the terminal ones sometimes horizontal.
    c. Calyx fleshy in fruit, bright crimson; glomerules 10 mm. in diam., not mealy. 3. *C. capitatum*
    c. Calyx slightly or not at all fleshy; glomerules 2–4 mm. in diam.
      d. Plant not mealy; calyx reddish when ripe. 4. *C. rubrum*
      d. Plant mealy; calyx green.

e. Leaves green beneath, 5–12 cm. long, triangular-hastate and acute, almost entire. 5. *C. Bonus-Henricus*
e. Leaves white beneath, 1–4 cm. long, oblong, coarsely few-toothed. 6. *C. glaucum*
b. Seeds all horizontal.
c. Sepals thin, not keeled, somewhat open in fruit; mature glomerules 1.5–3 mm. in diam.; leaves and flowers rarely slightly mealy.
d. Panicles very loose and open, nearly naked; seeds 1.5 mm. in diam., with sharp edges; leaves large, with a few large teeth. 7. *C. hybridum*
d. Panicles narrow, racemose, leafy; seeds 1–1.1 mm. in diam., with obtuse edges; leaves smaller and more oblong, coarsely toothed. 8. *C. urbicum*
c. Sepals thick, more or less keeled, closed in fruit; mature glomerules 3–7 mm. in diam.; leaves and flowers mealy.
d. Seed 1.5–1.7 (2) mm. in diam.; sepals sharply carinate; leaves ovate, coarsely few-toothed, yellow-green or dark green. 9. *C. paganum*
d. Seed 1.2 mm. in diam., more lustrous; sepals thick, but scarcely carinate in life, somewhat so when dry; leaves ovate or lanceolate, few-toothed, glaucous green. 10. *C. album*

1. **C.** AMBROSIOIDES L. MEXICAN TEA.

Waste soil; rare. Aug. 20–Sept.

Along the lighthouse road, Ithaca, 1903 (*K. M. W.*), 1921 (*S. H. Burnham & C. L. Wilson*).

Naturalized from tropical Am. throughout the greater part of the U. S.

2. **C.** BOTRYS L. JERUSALEM OAK. FEATHER GERANIUM.

A weed of garbage dumps and waste gravelly soils; occasional. July–Oct.

Elmwood Ave., Dryden Road, railroad yards (*D.*!), and garbage dumps along the lighthouse road, Ithaca; Renwick; Kidders Ferry (*D.*); Sheldrake Point (*D.*); Union Springs (*D.*); Lockwood Flats (*J. J. Thomas*).

N. S. to Minn. and Wash., southw. to Fla., Ky., Mex., and Calif. Naturalized from Eurasia.

3. **C. capitatum** (L.) Asch. (*Blitum capitatum* of Cayuga Fl.) STRAWBERRY BLITE.

Recently cleared woodlands and thickets, on gravelly, upland, more or less calcareous, soils; rare. July 20–Aug.

Ridge near McLean Bogs (*L. H. MacDaniels*); e. of Pony Hollow (*D.*); Freeville, near bog (*D.*); near Ludlowville (*H. B. Lord*); Ledyard, 1827 (*J. J. Thomas*).

E. Que. to Alaska, southw. to n. N. J., Pa., Ill., Minn., and in the Rocky Mts. to Colo.; rare or absent on the Atlantic Coastal Plain. Found also in Eu.

4. **C. rubrum** L. COAST BLITE. RED GOOSEFOOT.

Low brackish soils; rare. Aug.–Sept.

Hibiscus Point, 1922 (*M. L. Fernald, A. J. E., & K. M. W.*); meadows n. e. of Montezuma village (*D.*!).

In saline places, Newf. to N. J., and inland across the continent.

5. **C.** BONUS-HENRICUS L. GOOD-KING-HENRY.

A weed of yards, rich garden soils, and roadsides; rare. Aug.

Oneida Place, Ithaca, 1916.

N. S. to Ont., southw. to Mass. and s. N. Y., often escaping locally from cultivation, where it is grown as a potherb. Naturalized from Eu.

6. **C.** GLAUCUM L. OAK-LEAVED GOOSEFOOT.

A weed of sandy or gravelly waste places, mostly in neutral soils; scarce. June 20–Aug.

Railroad yards, Ithaca, East Ithaca, and Freeville; Myers Point (abundant, 1918); railroad tracks at Cayuga Branch; muddy strand of Cayuga Lake opposite Cayuga; bed of abandoned canal n. of Cayuga; and elsewhere.

Almost throughout N. A., except in the extreme North. Native of Eu.

7. **C. hybridum** L. MAPLE-LEAVED GOOSEFOOT.

Waste places, mostly in gravelly soils; frequent. Aug.–Sept.

Near Coy Glen; Six Mile Creek; various places in Ithaca; and elsewhere. This species occurs occasionally in openings in woods, and on the cliffs at Esty Glen and King Ferry, and in such locations it appears as though indigenous (*D.*!).

Que. and Me. to B. C., southw. to Va., Tex., and Calif., including the Atlantic Coastal Plain. Found also in Eu.

8. **C.** URBICUM L.

Waste places and shores, in sandy or gravelly soils; rare. Aug.–Sept.

Ithaca, Cayuga St., 1880 (*D.*), and Aurora St., 1882 (*D.*); along the lighthouse road, 1921 (*S. H. Burnham & C. L. Wilson*); shore of Cayuga Lake, near Hibiscus Point, 1918; bed of abandoned canal n. of Cayuga, 1919.

N. S. to Ont., southw. to Md. and Mo. Adventive from Eu.

9. **C.** PAGANUM Reich. PIGWEED.

Cultivated fields and waste places, in rich soils, especially about old buildings; frequent. July–Sept.

Stratton; near Coy Glen; near Buttermilk Creek; Ithaca flats; C. U. campus; near Benson Corners; Salmon Creek valley; s. of Union Springs; and elsewhere.

Widely distributed in N. A. Naturalized from Eurasia.

A color form, with the stems brilliantly purple and the leaves and fruit often purplish, is frequent on the Ithaca flats.

10. **C.** ALBUM L. LAMB'S QUARTERS. PIGWEED.

Cultivated fields and waste places, in rich soils; common. July–Sept.

Almost throughout N. A., except in the extreme North. Naturalized from Eurasia.

It has not been possible to separate this species from *C. lanceolatum* Muhl. Numerous forms occur which are transitional in all the distinctive characters usually cited. Some of these forms appear to be of undoubted environmental origin.

2. **Atriplex** (Tourn.) L.

a. Leaves lanceolate to narrowly lanceolate, often slightly hastate, usually entire. 1. *A. patula*

a. Leaves broadly ovate, hastate, more or less irregularly toothed. 1a. *A. p.*, var. *hastata*

1. **A. patula** L. (*A. patula*, var. *littoralis*, of Cayuga Fl.)

Waste places and shores, in diverse, often marly or saline, soils; frequent. Aug.–Oct.

Streets and vacant lots, Ithaca (*D.*!); C. U. campus; on various points on the lake shore near Union Springs (*D.*!); shores of marl pools, Hibiscus Point; and elsewhere.

Along the coast, Newf. to N. J. and B. C. to Calif.; possibly adventive inland and not native, N. Y. to N. Dak., southw. to Fla. and Ala. Found also in Eurasia and n. Africa.

1a. **A. patula** L., var. **hastata** (L.) Gray.

In situations similar to the preceding; frequent. Aug.–Oct.

Streets of Ithaca; C. U. campus; Renwick; around the Ithaca Salt Works; railroad yards, Freeville; salt flats, Montezuma; and elsewhere.

Newf. to Oreg., southw. to S. C. and Calif. Found also in Eurasia and n. Africa.

3. Salicornia (Tourn.) L.

1. **S.** EUROPAEA L. GLASSWORT. SAMPHIRE.

Wet brackish soil; rare. Aug.–Oct.

Borders of a salty pool near the Ithaca Salt Works (along railway w. of Willow Ave.). The plant was found in great quantity in 1913, 1917, 1921, 1923, and 1925. Along with *Juncus compressus*, it suddenly appeared after the salt works were established. How the seeds reached this point, unless they were introduced with coastal sand used in a neighboring glass factory, is a question. This explanation seems reasonable, but the glass factory was abandoned several years before the salt works were established.

Salt marshes along the coast, N. B. to Ga. and Alaska to B. C.; also inland in N. B. and N. Y. Elsewhere the species occurs in Eurasia, Africa, W. I., and E. I.

4. Salsola L.

1. **S.** KALI L., var. TENUIFOLIA Meyer. RUSSIAN THISTLE.

A weed of waste places, in gravelly, chiefly limy or salty, soils; becoming occasional. Aug.–Oct.

Near the Home Economics and Poultry Buildings, Agricultural College campus, formerly; Six Mile Creek; perhaps elsewhere.

Native of Asia. Naturalized and abundant as a weed in the n. w. U. S., and sparingly naturalized eastw.

41. AMARANTHACEAE (AMARANTH FAMILY)

a. Flowers monoecious or polygamous; both kinds of flowers with 3 or 5 sepals. 1. AMARANTHUS

a. Flowers dioecious; pistillate flowers naked; sepals of the staminate flowers 5, conspicuous, oblong, mucronate, longer than the bracts; spikes slender. [ACNIDA]

1. Amaranthus (Tourn.) L.

a. Flowers in dense contracted panicles terminating the branches; stamens and sepals 5; plant erect, rather tall; leaves large, ovate-lanceolate, 3–15 cm. long.
  b. Branches of the panicle 8–20 mm. wide, stout; main bracts 4–6 mm. long; sepals of the pistillate flowers obtuse and often emarginate, frequently mucronate, appressed. 1. *A. retroflexus*
  b. Branches of the panicle about 5 mm. wide above the middle, slender; main bracts 2–3.5 mm. long or less; sepals of the pistillate flowers acute, mucronate, looser. 2. *A. hybridus*

a. Flowers in axillary clusters; stamens 2–3; sepals 1–5; plant low, diffuse or prostrate; leaves small, spatulate, 1–7 cm. long.
  b. Leaves with rigid stipular spines. [*A. spinosus*]
  b. Leaves without stipular spines.
    c. Sepals 3–5; seed 1.5 mm. wide; utricle smooth; plant prostrate; upper leaves scarcely reduced. 3. *A. blitoides*
    c. Sepals 1–3; seed 0.6–0.8 mm. wide; utricle rugose; plant erect, low, diffusely branched; leaves toward the ends of the branches much reduced; bracts more prominent and more pungently pointed. 4. *A. graecizans*

1. **A.** RETROFLEXUS L. GREEN AMARANTH. AMARANTH PIGWEED.

A weed of cultivated fields and waste places, in various rich soils if not too heavy; very common. July 20–Sept.

Widely distributed in N. A. except in the Far North. Naturalized from tropical Am.

2. **A.** HYBRIDUS L. (*A. chlorostachys* of Cayuga Fl.) GREEN AMARANTH. AMARANTH PIGWEED.

In waste places and fields, in rich soil; frequent. July 20–Sept.
Quarry St., Ithaca; Ithaca flats; Renwick; and elsewhere.
Range the same as that of the preceding species. Naturalized from tropical Am. The form with purple spikes, forma *hypochondriacus* (L.) Robins., is occasional.

[**A.** SPINOSUS L. THORNY AMARANTH.

Found in 1921 along the lighthouse road, Ithaca (*S. H. Burnham & C. L. Wilson*). Me. to Minn. and southw. Adventive from tropical Am.]

3. **A.** BLITOIDES Wats.

A weed of dry gravelly soil, on roadsides and in waste places; scarce. July–Aug.
Along the railroad, North Spencer; railroad ballast, Renwick; C. U. campus, near the Veterinary Building; Union Springs, by the railroad, 1881 (*D.*); w. of Cayuga Bridge, 1885 (*D.*).
Minn. to Wash., southw. to Mo., Kans., Colo., and Mex.; adventive eastw., chiefly on railroad ballast.

4. **A.** GRAECIZANS L. (*A. albus* of Cayuga Fl.) TUMBLEWEED.

A weed of cultivated grounds, roadsides, waste places, and shores, mostly in gravelly soil; common. July 20–Aug.
Widely distributed in N. A., except in the extreme North. Appearing as though adventive from the West or the South.
The plants break away in late autumn when dry and stiff, and are rolled about by the wind, the seeds being thus distributed. In the West large drifts are often formed against fences and hedges.

[**Acnida** L.]

[**A.** TUBERCULATA Moq. WATER HEMP.

Found in 1916 near the old salt works on the Ithaca flats (*F. P. Metcalf*); not seen since.
Vt. to Dak., southw. to Ky., La., and Mo.]

42. PHYTOLACCACEAE (POKEWEED FAMILY)

1. Phytolacca (Tourn.) L.

1. **P. americana** L. (See Rhodora **17**: 180. 1915. *P. decandra* of Cayuga Fl. and of Gray's Man., ed. 7.) POKEWEED. SCOKE. GARGET.

Borders of damp upland woods, roadsides, and in old pastures, in loamy, gravelly, neutral or acid, soils; frequent. July–Aug.
Near Summit Marsh; Six Mile Creek; near the Forestry Building; region of McLean Bogs; and elsewhere.
S. Me. to Ont. and Minn., southw. to Fla., Ark., and Mex., including the Coastal Plain.
Young shoots of this plant may be eaten like asparagus, but the root is poisonous. The juice of the berries was used by the Indians for staining basketwork.

43. ILLECEBRACEAE (KNOTWEED FAMILY)

a. Calyx urn-shaped, 5-cleft, indurated, bearing the stamens (usually 10) on the throat; stipules 0. 1. SCLERANTHUS
a. Calyx open, of 5 separate thin sepals; stamens 2–3 (5), nearly hypogynous; stipules present; plants slender, capillary. 2. ANYCHIA

1. Scleranthus L.

1. **S.** ANNUUS L. KNAWEL.

A weed of dry gravelly or sandy waste fields and roadsides, in acid or slightly alkaline soils; rare. May–Sept.

Field s. of Coy Glen (*D.*); South Ave., C. U. campus; Sheldrake Point (*D.* in C. U. Herb., *A. J. E. & K. M. W.*).

Que. to Ont., southw. to Fla., mostly near the coast. Naturalized from Eu.

2. Anychia Michx.

1. **A. canadensis** (L.) BSP. (*A. dichotoma* of Cayuga Fl.) FORKED CHICKWEED.

Dry stony and gravelly banks along the borders of woods and thickets, in acid or neutral soils; frequent. July.

Upper Enfield Glen; Cascadilla Creek (*D.*); Fall Creek (*D.*!); Renwick Heights; near McKinneys (*D.*!); Esty Glen; Shurger Glen; Salmon Creek, Ludlowville (*D.*!); Taughannock Gorge (*D.*); cliffs n. of Lake Ridge; King Ferry; and elsewhere (*D.*!).

Vt. and Ont. to Minn., southw. to Ga., Ark., and Kans.; less frequent on the Coastal Plain.

House (Bul. N. Y. State Mus. 254: 311. 1924) transfers this Linnean name to *A. polygonoides* Raf., but the original description seems to apply to the present species.

44. AIZOACEAE (CARPET-WEED FAMILY)

1. Mollugo L.

1. **M.** VERTICILLATA L. CARPET WEED.

A weed in dry gravelly or sandy waste places; infrequent. July–Sept.

Railroad tracks and yards in ballast, on South Hill and at the railroad stations; C. U. campus (*D.*); near the "Nook" (*D.*); near Renwick (*D.*); Stewart Park; Union Springs.

N. B. to Minn. and Wash., southw. to Fla., Tex., and Mex. Naturalized from warmer Am.

45. CARYOPHYLLACEAE (PINK FAMILY)

a. Sepals separate, more or less spreading.
- *b.* Stipules present.
  - *c.* Leaves opposite; styles 3. — 1. SPERGULARIA
  - *c.* Leaves whorled; styles 5. — 2. SPERGULA
- *b.* Stipules wanting.
  - *c.* Capsule splitting into valves; plant glabrous or stems pubescent in lines, scarcely viscid.
    - *d.* Leaves linear-filiform; plants low and tufted; styles alternate with the sepals; petals entire, shorter than the sepals, or wanting. — 3. SAGINA
    - *d.* Leaves linear to broader; plants less tufted; styles opposite some or all of the sepals.
      - *e.* Petals entire; stems wiry, terete. — 4. ARENARIA
      - *e.* Petals 2-parted or wanting; stems usually softer, sometimes 4-angled. — 5. STELLARIA
  - *c.* Capsule curved-cylindric, opening by a row of teeth at apex; petals 2-parted; plant hairy, usually viscid. — 6. CERASTIUM

a. Sepals united; calyx tubular.
- *b.* Calyx naked at base; seeds globular or reniform; embryo markedly curved.
  - *c.* Styles 5; calyx 10-nerved.

d. Sepals with long herbaceous tips; styles opposite the petals, the latter unappendaged. 7. AGROSTEMMA
d. Sepals not long-tipped; styles alternate with the petals, the latter with a scale at top of claw. 8. LYCHNIS
c. Styles 3; calyx 10-nerved (see also 3d *c*). 9. SILENE
c. Styles 2; calyx obscurely nerved or 5-nerved.
d. Calyx ovoid or cylindric, large, terete or 5-angled, obscurely nerved; leaves ovate or elliptic, palmately nerved. 10. SAPONARIA
d. Calyx top-shaped, small, 5-nerved; leaves linear-filiform. 11. GYPSOPHILA
b. Calyx surrounded by an involucre of bracts at base; seeds dorsally flattened; embryo nearly straight; styles 2. 12. DIANTHUS

1. Spergularia J. & C. Presl.

1. **S. alata** Wiegand. (See Rhodora **22**: 15. 1920.) SAND SPURRY.

Low ground, in saline situations; very rare. July–Aug.

Salt flats e. of Montezuma village (*L. Griscom* and *F. P. Metcalf*!); Salt Pond w. of Howland Island (*K. M. W. & F. P. Metcalf*).

Known only from these stations.

2. Spergula L.

1. **S.** ARVENSIS L. CORN SPURRY.

A weed of cultivated fields and waste places, in sandy or gravelly, mostly neutral, soils; infrequent. July–Aug.

Scattered throughout the basin, but usually absent from the heavier soils.

Newf. and N. E. to Calif., southw. to S. C. Naturalized from Eu.

3. Sagina L.

1. **S.** PROCUMBENS L. PEARLWORT.

Damp shaded gravelly lawns; May 25–June 20.

Close to the east steps, Morse Hall, C. U. campus, 1918–1921, abundant over a small area.

Greenland and Newf. to Pa. and Del.; also Ont. and Mich. Undoubtedly of recent introduction at Ithaca from the coast or from Eurasia.

4. Arenaria L.[15]

a. Leaves elliptical, blunt; petals exceeding the blunt sepals; ovary at first 3-celled; seeds smooth, appendaged at the hilum. 1. *A. lateriflora*
a. Leaves ovate, acute; petals not exceeding the acute sepals; ovary 1-celled; seeds papillose, not appendaged. 2. *A. serpyllifolia*

1. **A. lateriflora** L. SANDWORT.

Dry sandy, gravelly, or stony, partly wooded, banks, in acid soils, also in the muck of alder thickets and the moss of bogs; frequent. May 20–June.

Dry-soil localities are: "across the road from the Valley Cemetery" (*D.*); South Hill, s. of the Morse Chain Works and above the railroad (*D.*!); Lockwood Flats (*J. J. Thomas*!). Bog stations are: Fleming Meadow (*D.*); Larch Meadow (*D.*!); Indian Spring marsh (*D.*); Mud Creek Swamp (*D.*!); Malloryville Bog (*D.*!); Mud Pond, McLean Bogs; Miller Bog, Spring Lake; Duck Lake; near Turtle Pond; arbor vitae swamp e. of Clyde.

Arctic Am. southw. to N. J., Pa., Ohio, Ill., S. Dak., and Mo., including the Atlantic Coastal Plain; also the mts. of Mont., Wash., Oreg., Colo., and N. Mex. Found also in Eurasia.

[15] For reasons for maintaining Arenaria as a comprehensive genus, see Fernald, Rhodora 21 : 1. 1919.

The soil preference of this plant is not clear. It grows in both dry and wet soil. While the dry-soil stations of the Cayuga Lake Basin are probably neutral or acid, the bog stations are all on marl or in highly calcareous localities.

2. **A.** SERPYLLIFOLIA L. THYME-LEAVED SANDWORT.

A weed in sandy or gravelly cultivated fields and waste places, if not too calcareous; common. May–Dec.

Nearly throughout N. A., except in the extreme North. Naturalized from Eurasia.

Variable; the more slender forms have been called var. *tenuior* Mert. & Koch (*A. leptoclados* of Gray's Man., ed. 7).

5. Stellaria L.

a. Plant glabrous.
  b. Bracts foliaceous. 1. *S. borealis*
  b. Bracts scale-like, scarious-margined.
    c. Leaves linear; stem often rough-angled; seeds smooth; inflorescence soon becoming lateral. 2. *S. longifolia*
    c. Leaves lanceolate; stem smooth; seeds rough; inflorescence more ample and more commonly appearing terminal. 3. *S. graminea*
a. Plant hairy in lines.
  b. Leaves linear; petals much exceeding the calyx, not deeply lobed. [*S. Holostea*]
  b. Leaves ovate; petals not exceeding the calyx, deeply lobed. 4. *S. media*

1. **S. borealis** Bigel.

Springy mossy places, with little reference to lime content of the soil though many of the local stations are calcareous; infrequent. June.

Hillside n. of station, North Spencer; e. bank of Michigan Creek; Michigan Hollow Swamp; s. e. of Brookton; South Hill (*D.*); Mud Creek, Freeville; Freeville Bog; McLean Bogs; Beaver Brook (*D.*); swamp, West Dryden; arbor vitae swamp e. of Clyde.

Newf. and Lab. to Alaska, southw. to n. N. J., Pa., Mich., Minn., Colo., and Calif.; infrequent or rare on the Atlantic Coastal Plain. Found also in Eurasia.

Several varieties are recognized by Fernald (Rhodora **16**:150. 1914), of which three are found in the Cayuga Lake Basin — the typical form, the var. *isophylla* Fernald, and the var. *floribunda* Fernald. The differences, however, are very slight, and such as might readily be due to environment. These tendencies seem scarcely sufficient to make the forms worthy of varietal rank.

2. **S. longifolia** Muhl.

Damp or wet grassy places, in sandy or gravelly but somewhat mucky, mostly neutral, soils; frequent. May 20–July 10.

Michigan Hollow Swamp; Brookton Springs (*D.*); above Enfield Falls and in the ravine; mouth of Lick Brook; Larch Meadow; n. of Coy Glen; s. of Mecklenburg; Parkway, Cayuga Heights; formerly on C. U. campus (*D.*); Indian Spring marsh (*D.*); Freeville (*D.*!); Mud Creek, Freeville; McLean Bogs; Beaver Brook (*D.*); Spring Lake.

Newf. to Alaska, southw. to Md., Ky., and La., the Rocky Mts., and B. C.; occurs sparingly on the Atlantic Coastal Plain.

3. **S.** GRAMINEA L.

Damp grassy places, in gravelly or sandy soils; scarce. June–July.

On the Chi Psi (Fiske) grounds, 1885 (*D.*); South and East Aves., C. U. campus; above Forest Home; Ringwood; Cayuga Heights; Myers Point; Kidders; n. of Mud Pond, Conquest.

Newf. to Ont., southw. to Md. Naturalized from Eurasia.

[S. HOLOSTEA L. EASTER BELL.

Cemetery, University Ave., Ithaca, 1903 (*H. S. Jackson*) ; occasionally cultivated, and probably not spontaneous in this locality.]

4. **S.** MEDIA (L.) Cyrill. COMMON CHICKWEED.

A weed of cultivated ground and waste places, in rich soil; very common. Mar.–Dec.

Nearly throughout N. A. Naturalized from Eurasia.

6. Cerastium L.

a. Petals about 10 mm. long; sepals and leaves rather stiff, the leaves with fascicles of leaves in the axils; perennials. 1. *C. arvense*

a. Petals 7 mm. long or less; sepals and leaves soft, the leaves oblong or oblong-linear, without axillary fascicles; annuals.

b. Lower pedicels 4–14 mm. long; petals not exceeding the sepals; leaves short, obtuse. 2. *C. vulgatum*

b. Lower pedicels 15–50 mm. long; petals twice the length of the sepals; flowers nodding; leaves longer and more acute. 3. *C. nutans*

1. **C.** ARVENSE L.

Lawns and other grassy places; rare. May.

Corner of East and South Aves. and near Stone Hall, C. U. campus; cemetery, University Ave. (*D.*!) ; Chi Psi (Fiske) grounds (*D.*).

Native on rocky serpentine soils: Lab. to Alaska, southw. to Del., Pa., Ind., Minn., Colo., and Calif., also along the mts. to Ga. The plant of lawns and fields is probably naturalized from Eu.

2. **C.** VULGATUM L. (*C. viscosum* of Cayuga Fl.) MOUSE-EAR CHICKWEED.

A weed of roadsides, cultivated fields, and waste places; very common. May–Sept.

Nearly throughout N. A. Naturalized from Eu.

3. **C. nutans** Raf.

Rich bottom-land woods; infrequent. May–June.

Coy Glen (*D.*) ; Negundo Woods; South Hill (*D.*) ; Renwick Farm (*D.*) ; Fall Creek, near mill pond (*D.*) and near Beebe Lake (*D.* in C. U. Herb.) ; swampy woods n. of Freeville (*D.*) ; lake shore ravines (*D.*) ; ravine near Elm Beach, Romulus.

N. S. and Vt. to B. C., southw. to Fla., Tex., and Mex.; infrequent on the Atlantic Coastal Plain. A plant of the rich soils of the interior.

7. Agrostemma L.

1. **A.** GITHAGO L. (*Lychnis Githago* of Cayuga Fl.) CORN COCKLE.

A weed in grainfields, more rarely in waste places; frequent. June–Aug.

Widely distributed in N. A. Introduced from Eurasia.

8. Lychnis (Tourn.) L.

a. Plant white-woolly; petals purple; calyx teeth twisted. 1. *L. Coronaria*

a. Plant green; calyx teeth not twisted.

b. Flowers scarlet, in a capitate cluster, perfect; leaves clasping by a broad base. 2. *L. chalcedonica*

b. Flowers white, in an open cyme, dioecious; leaves tapering at base. 3. *L. alba*

1. **L.** CORONARIA (L.) Desr. MULLEIN PINK.

Roadsides; rare. June–Aug.

Elm St., Ithaca, 1915–1921, distributed over a considerable area and apparently established.

Native of Eu. Escaped from cultivation.

[L. FLOS-CUCULI L.

This species appeared in a lawn on Cayuga Heights in 1919.]

2. **L. CHALCEDONICA** L. SCARLET LYCHNIS.

Roadsides; rare. June–Sept.

Bank by street-railroad tracks, The Knoll, Ithaca; Forest Home. [Also on a rocky wild bank in the narrows along the outlet of Cayuta Lake.]

Native of Japan. Escaped from cultivation.

3. **L. ALBA** Mill. (*L. vespertina* of Cayuga Fl.) WHITE CAMPION.

A weed in gravelly waste places, with little reference to lime content of the soil; frequent. June–July.

Inlet Valley, near Coy Glen; C. U. campus, in several places; "Fiske-McGraw [Chi Psi] grounds, west of the spring, 1884 and 1885" (*D.*), the first record of its occurrence in this flora; Cayuga Heights, in several places; and elsewhere.

N. S. to Mich., southw. to N. Y. and Penn. Naturalized from Eu.

9. Silene L.

a. Calyx *not inflated except by the enlarging capsule, longitudinally ribbed;* leaves opposite; annuals.
- *b.* Plant glabrous or nearly so, a part of each internode glutinous; flowers pink.
  - *c.* Leaves linear-lanceolate; calyx ovoid; plant tall, slender and wiry; flowers paniculate. 1. *S. antirrhina*
  - *c.* Leaves ovate-lanceolate; calyx clavate; plant low, stouter; flowers corymbose. 2. *S. Armeria*
- *b. Plant glandular-pubescent, stout; flowers white or cream color.*
  - *c.* Flowers racemose and secund on the primary branches of the inflorescence; styles much exserted; calyx 12–15 mm. long. 3. *S. dichotoma*
  - *c.* Flowers in an open cyme; styles scarcely exserted; calyx 20–23 mm. long. 4. *S. noctiflora*

a. Calyx more or less inflated, papery, obscurely ribbed but with a network of delicate veins; perennials.
- *b.* Leaves whorled; petals fringed; calyx campanulate-funnel-form; plant puberulent. 5. *S. stellata*
- *b.* Leaves opposite; petals not fringed, obcordate; calyx subglobose; plant glabrous, glaucous. 6. *S. latifolia*

1. **S. antirrhina** L. SLEEPY CATCHFLY.

Open dry gravelly, chiefly neutral, soils; frequent. May 15–June.

N. w. of Enfield Falls; junction of Inlet and Enfield Creek; near mouth of Enfield Glen; railroad ballast n. e. of Buttermilk Falls; railroad s. of Ithaca (*D.*); flats near C. U. boathouse; C. U. campus; Cascadilla woods, abundant, 1885 (*D.*); near Esty Glen; near McKinneys (*D.*).

Me. to B. C., southw. to Fla. and Mex., including the Atlantic Coastal Plain.

The early rarity of this species in the Cayuga Lake Basin and its recent increase in frequency suggest that it may not be native here.

2. **S. ARMERIA** L.

"Ithaca, by road south-east of steamboat landing [junction of Cascadilla Creek and Inlet], July, 1885. Near Six Mile Cr. by Cayuga St." (*D.*); not seen since.

N. B. and Ont. to Mich., southw. to N. J. and Pa. Introduced from Eu.

3. **S.** DICHOTOMA Ehrh.

A weed of clover and grass fields, rarely of waste places, in gravelly soils; scarce. July.

N. Cayuga St., Ithaca; Cayuga Heights; along road from Cortland to Groton. Recently introduced with clover and grass seed, but doubtfully persisting.

Me. to N. J., Pa., and Tex.; also in Calif. Naturalized from Eu.

4. **S.** NOCTIFLORA L. NIGHT-FLOWERING CATCHFLY.

Roadside thickets and waste places, in rich gravelly, more or less calcareous, soils; frequent. June–Oct.

Dry Run, Spencer; waste places in Ithaca; C. U. campus; near Percy Field; and elsewhere.

N. S. to Man., southw. to Fla., Mo., and Utah. Naturalized from Eu.

Resembles *Lychnis alba,* from which it may be distinguished by its perfect flowers, 3 styles, smaller creamy petals, and absence of gynobase.

[**S.** PENNSYLVANICA Michx. WILD PINK.

"'In vicinity of Aurora,' 1840, in catalogue of Dr. Alex. Thompson, as native, but probably a garden-scape" (*D.*); not seen since.]

5. **S. stellata** (L.) Ait. f. STARRY CAMPION.

Dry open woods, in stony or gravelly acid soils with some admixture of clay; scarce. July–Aug.

E. slope of Cayuga Lake; near cemetery, University Ave., Ithaca; near the "Nook" (*D.*); Renwick slope (*D.*!); near McKinneys; Salmon Creek ravine. A plant of the heavier oak-vaccinium soils, and therefore rarely if ever found in the sandy chestnut woods back on the hills and at Junius.

Mass. to Minn., southw. to Ga., Ark., and Tex.; infrequent on the Coastal Plain.

6. **S.** LATIFOLIA (Mill.) Britten & Rend. BLADDER CAMPION.

A weed of dry sandy or gravelly acid or neutral soils, also in heavy clay; infrequent. June–Aug.

Inlet road near Enfield Glen; Enfield Falls road; near upper Coy Glen; Quarry St., Ithaca; C. U. campus, near Forestry Building; Cayuga Heights; n. of Wyckoff Swamp; near Westbury Bog; s. of Featherbed Bog. A plant of recent introduction, becoming more frequent.

E. Que. to Ont., southw. to N. J., Ill., and Iowa; also on the Pacific coast, and on the Atlantic Coastal Plain. Naturalized from Eurasia.

10. Saponaria L.

a. Calyx terete; flowers in rather dense clusters; leaves tapering at base. 1. *S. officinalis*

a. Calyx strongly 5-wing-angled; flowers in open cymes; leaves ovate, clasping by a broad base. 2. *S. Vaccaria*

1. **S.** OFFICINALIS L. BOUNCING BET. SOAPWORT.

A weed on gravelly banks, especially on bars in the streams and on railroad embankments, with little reference to lime content of the soil; very common. July–Sept.

Widely distributed in N. A., having escaped originally from gardens where it was an old-fashioned ornamental plant. Naturalized from Eu.

Flowers sometimes double.

2. **S.** VACCARIA L. COW-HERB.

Waste places, in gravelly soil; rare. July.

Ithaca: railroad yards; South Ave.; Cornell Heights; city dump on lighthouse road; C. U. campus, near the Home Economics Building. Doubtfully persistent.

Ont. to B. C., southw. to Ala., La., and Calif. Adventive from Eu.

11. Gypsophila L.

1. **G.** MURALIS L. BABY'S BREATH.

Waste places; rare. June–Sept.

A weed on C. U. athletic field, 1915 and later (*A. J. E. & C. C. Thomas*). Doubtfully persistent.

Me. to Minn., southw. to N. J. Adventive from Eu.

12. Dianthus L.

a. Leaves linear; petals small, scarcely exceeding the hairy calyx and bracts; annuals. 1. *D. Armeria*

a. Leaves elliptic-lanceolate, large; petals large and showy, with a broad limb; calyx and bracts glabrous; perennials. 2. *D. barbatus*

1. **D.** ARMERIA L. DEPTFORD PINK.

Dry sandy, gravelly, or stony, sterile fields and roadsides, in more or less calcareous soils; frequent. June 15–Aug. 10.

N. w. of Enfield Falls; South Hill, near the Morse Chain Works; s. slope of Turkey Hill, and valley near by (*D.*!); Etna to Ringwood; s. w. of Freeville (*D.*); pasture s. e. of McLean; Cornell Heights, near Fall Creek Drive; roadside, also lake shore talus, near Esty (Burdick's) Glen (*D.*!); w. of Townley Swamp; becoming more frequent during the past few-years.

N. S. to Ont., Mich., and Iowa, southw. to Ga., including the Coastal Plain. Naturalized from Eu.

2. **D.** BARBATUS L. SWEET WILLIAM.

Grassy roadsides and waste places, in rich gravelly soils; scarce. June–July.

Escaped from cultivation: road to Michigan Hollow, Danby; Rumsey Brook, base of Saxon Hill (*D.*); s. e. part of Enfield Township; upper Coy Glen; C. U. athletic field; Cascadilla woods (*D.*); s. of cemetery, University Ave. (*D.*); near Mud Pond, Conquest.

Eastern and Middle States. Native of Eu.

46. PORTULACACEAE (PURSLANE FAMILY)

a. Ovary superior; capsule 3-valved; leaves 2, large, opposite, near the middle of the stem; stamens 5; flowers pink. 1. CLAYTONIA

a. Ovary half inferior; capsule circumscissile; leaves many, small, alternate; stamens 7–12; flowers yellow. 2. PORTULACA

1. Claytonia (Gronov.) L.

a. Leaves linear-lanceolate or linear, 7–16 cm. long. 1. *C. virginica*

a. Leaves oblong-lanceolate or oval-lanceolate, 2.5–5 cm. long. 2. *C. caroliniana*

1. **C. virginica** L. NARROW-LEAVED SPRING BEAUTY.

Dry or damp woodlands and banks, in soils with humus; common. Apr. 15–May 15.

Slopes of the Inlet Valley; Negundo Woods (*D.*); Six Mile Creek (*D.*!); Ellis Hollow; Freeville (*D.*!); McLean (*D.*!); Esty Glen; Lansing, abundant; "especially abundant in pastures e. of Levanna and Union Springs" (*D.*!); and elsewhere.

N. S. to Sask., southw. to Ga. and Tex.; found sparingly on the Coastal Plain.

2. **C. caroliniana** Michx. BROAD-LEAVED SPRING BEAUTY.

Dry or damp woodlands and banks, in rich, more or less calcareous, soils with humus; less common than the preceding. Apr. 15–May 15.

Enfield; Negundo Woods (*D.*); Six Mile Creek (*D.*!); e. of Caroline Depot; Ellis Hollow; Freeville; McLean; Merrifield. "About the same range as the preced-

ing. It mostly replaces it on the higher ground farther from the lake, e. of Levanna and Union Springs" (*D.*). This seems to be a plant of more calcareous regions and of richer soil than the preceding, also often of more swampy soil.

N. S. to Sask., southw. to Ohio, Mo., and along the mts. to N. C.; rare or absent on the Coastal Plain.

2. **Portulaca** (Tourn.) L.

1. **P.** OLERACEA L. COMMON PURSLANE.

A weed in cultivated ground and waste places where the soil is not too heavy; common. July–Sept.

Nearly throughout N. A. Naturalized from Eu. Formerly cultivated as a potherb.

47. CERATOPHYLLACEAE (HORNWORT FAMILY)

1. **Ceratophyllum** L.

1. **C. demersum** L. HORNWORT.

Submerged in pools and bays, and in marshes; common. June–July; fr. Aug.
Throughout N. A. except in the extreme North.

48. NYMPHAEACEAE (WATER LILY FAMILY)

a. Sepals 4–6; petals many, in several rows; ovary 1, 8–30-celled; leaves oval or orbicular, cordate.
  b. Petals and stamens hypogynous, the petals inconspicuous, yellow. 1. NYMPHOZANTHUS
  b. Petals and stamens inserted on the sides and near the summit of the ovary, the petals showy, white. 2. NYMPHAEA
a. Sepals and petals each 3–4; carpels 4–18, separate; leaves oval, peltate (see also 3d *a*). 3. BRASENIA
a. Sepals many, in several rows, passing into the many petals; carpels several, free, sunken in the enlarged receptacle; leaves suborbicular, peltate. 4. NELUMBO

1. **Nymphozanthus** Richard

a. Flowers 4–6 cm. in diam.; stigma mostly 12–20-rayed, yellow or pale red; fruit with the persistent, partly decayed stamens at base; leaves large, 17–33 cm. long, thick, the basal lobes about half as long as the body.
  b. Leaves erect, with terete petioles and a usually open sinus; sepals green-tinged inside at base; fruit green. 1. *N. advena*
  b. Leaves floating, with flattened petioles and a closed or narrow sinus; sepals red-tinged inside at base; fruit reddish. 2. *N. variegatus*
a. Flowers 3 cm. in diam. or less; stigma 6–10-rayed, red; fruit naked at base; leaves 3.5–10 cm. long, thinner, the basal lobes nearly as long as the body; sinus deep and narrow, usually closed. 3. *N. microphyllus*

1. **N. advena** (Ait.) Fernald. (See Rhodora 21: 183. 1919. *Nuphar advena* and *Nymphaea advena* of many authors.) COW LILY. SPATTERDOCK. YELLOW POND LILY.

Swales and marshes, in rich bottom-land soils, also in marly situations; frequent. June–Aug.

About the larger marshes of the basin, and along streams: Slaterville Swamp; near the mouth of Fall Creek, and by the Ithaca fair grounds; back of Stewart Park; Cayuga Marshes; Vandemark Pond.

N. Y. to Wis., southw. to N. C., Ky., Mo., and Kans., including the Coastal Plain but not characteristic of that region.

2. **N. variegatus** (Engelm.) Fernald. (*Nuphar variegatum* and *americanum* and *Nymphaea variegata* and *americana* of various authors.)

In the ponds of peat bogs, and in other places where the soil is of a more acid and mucky nature than where the preceding species occurs; frequent. June–Aug.

Spencer Lake; Summit Marsh; Etna mill pond; Lake Como; Phillips Pond.

Newf. to B. C., southw. to n. N. J., Pa., Ohio, and Mont.; infrequent on the Atlantic Coastal Plain.

This species is somewhat doubtfully distinct from the preceding, at least in certain parts of its range.

3. **N. microphyllus** (Pers.) Fernald. (*Nuphar pumilum* of Cayuga Fl. *Nuphar Kalmianum* (Michx.) Ait. *Nuphar microphyllum* and *Nymphaea microphylla* of various authors.)

In small ponds and slow-flowing streams; rare. July–Aug.

North Spencer, 1880 (*D.*); ditches near the Ithaca fair grounds (*D.*); bayou near mouth of Fall Creek, 1876 (*D.*); [Groton mill pond, 1877 (*Prof. S. G. Williams*), same station, 1881 (*D.*)]. "Flowers have never been found in this region" (*D.*). The plant is at present unknown to the authors in the Cayuga Lake Basin, though it occurs twenty-five miles to the eastward. There is a possibility that it may have been confused with the preceding species.

E. Que. and N. B. to Ont. and Minn., southw. to Conn., n. N. J., Pa., and Ohio.

2. Nymphaea L.

a. Flowers 7–12 (15) cm. in diam., sweet-scented; sepals often purplish outside; petals generally with an ovate apex; inner filaments narrower than the anthers; seeds 1.5–2.3 mm. long; leaves usually purplish beneath and indistinctly veined; branches of the rhizome not constricted at base. 1. *N. odorata*

a. Flowers 10–23 cm. in diam., scentless or nearly so; sepals green; petals generally rounded at apex; filaments broader than the anthers; seeds 2.8–4.4 mm. long; leaves green beneath and prominently veined, usually larger; branches of the rhizome constricted at base, tuber-like, readily detachable. 2. *N. tuberosa*

1. **N. odorata** Ait. (Including var. *minor* Sims. *Castalia odorata* of various authors. See Rhodora **18**:161. 1916.) SWEET WATER LILY. WHITE WATER LILY.

In acid, neutral, or slightly alkaline ponds and marshes; infrequent. July–Aug.

Spencer Lake; Summit Marsh (*D.*!); Cayuta Lake (*D.*); Lake Como (Locke Pond, *D.*); Canoga Marshes (*D.*!); Cayuga Bridge (*D.*!).

Newf. to Man., southw. to Fla., La., and Kans.; a characteristic plant on the Coastal Plain.

(For a discussion of the differences between this species and the next, see Conard, Proc. Iowa Acad. Sci. **23**:621. 1916.)

2. **N. tuberosa** Paine. (*Castalia tuberosa* of various authors.)

Marshes and lake borders; local. July–Aug.

Renwick; Beebe Lake; abundant in Fall Creek at Freeville and Etna; "from Cayuga Bridge, north; abund. near Black Lake" (*D.*!).

Lake Champlain to Trenton, N. J., westw. to Nebr. and Ark.

This is a plant of the richer, less acid marshes and waters of the interior. Conard expresses some doubt as to its validity as a species, but observation in this flora gives the impression that it is such. It is said to have been introduced into the mill pond at Freeville from Lake Ontario. This introduction probably occurred after the publication of Dudley's *Cayuga Flora*.

3. **Brasenia** Schreb.

1. **B. Schreberi** Gmel. (*B. peltata* of Cayuga Fl.) WATER SHIELD.

Ponds, in both calcareous and acid waters; scarce. Aug.

Spencer Lake; Cayuta Lake (*D.*); ditch by the Ithaca fair grounds (*C. H. Wilmarth*, 1876, D.), also in 1880 (*D.*); Lake Como (Locke Pond, *D.*); Duck Lake.

N. S. to Man., southw. to Fla., Tex., and Nebr., including the Coastal Plain, and on the Pacific coast. Found also in Cuba and Mex., Asia, Afr., and Austr.

4. **Nelumbo** (Tourn.) Adans.

1. **N.** LUTEA (Willd.) Pers. YELLOW NELUMBO.

Well established in the cove on the north shore of Farley Point, where apparently it has been recently introduced.

Mass. to Minn., southw. to Fla. and Tex.

49. **RANUNCULACEAE** (CROWFOOT FAMILY)

a. Ovaries several-ovuled (1 or 2 in no. 7); fruit a follicle or a many-seeded berry; calyx generally petaloid.
  b. Petals present, nectariferous; leaves simple or compound.
    c. Petals large, spurred; leaves ternately decompound, with crenately lobed leaflets. 1. AQUILEGIA
    c. Petals smaller, not spurred, equaling or shorter than the sepals, frequently modified as nectaries.
      d. Leaves ternately decompound; leaflets incised-serrate.
        e. Flowers in long, usually paniculate, racemes; carpels 1-2, follicular in fruit. 2. CIMICIFUGA
        e. Flowers in short simple racemes; carpel 1, baccate in fruit. 3. ACTAEA
      d. Leaves palmately 1-compound, or merely lobed or parted.
        e. Flowers pale yellow, large; petals with a nectariferous pit on the inner face; leaves lobed and incised. 4. TROLLIUS
        e. Flowers white, small; petals club-shaped, with a terminal nectariferous pit; leaves 3-foliolate, evergreen. 5. COPTIS
  b. Petals absent; leaves simple.
    c. Calyx large, *showy, bright yellow*; *leaves reniform*, crenate *only*; *flowers* cymose. 6. CALTHA
    c. Calyx small, greenish white, caducous; leaves sharply incised-lobed; flowers solitary. 7. HYDRASTIS
a. Ovaries 1-ovuled; fruit an achene.
  b. Styles not enlarged in fruit; sepals imbricated in the bud; the basal leaves, and sometimes the cauline ones, alternate; plants not climbing.
    c. Sepals and petals both present, the petals the more showy. 8. RANUNCULUS
    c. Sepals often petaloid; petals absent.
      d. Cauline leaves all alternate, ternately decompound with crenately lobed leaflets; flowers small and numerous, panicled; sepals 4 (5); achenes ribbed. 9. THALICTRUM
      d. Cauline leaves opposite or whorled, or appearing like a calyx; flowers few; sepals large, showy.
        e. Cauline leaves whorled, distant from the flowers, lobed and incised, or ternately decompound.
          f. Achenes ribbed; leaves ternately decompound with crenately lobed leaflets. 10. ANEMONELLA
          f. Achenes not ribbed; leaves palmately incised, lobed, parted, or divided. 11. ANEMONE

c. Cauline leaves sepal-like, close beneath the flowers, entire; radical leaves with 3 entire lobes. 12. HEPATICA
b. Styles enlarged and plumose in fruit; sepals valvate; leaves opposite; plants climbing. 13. CLEMATIS

1. Aquilegia (Tourn.) L.

a. Spurs straight; flowers scarlet, yellow inside. 1. *A. canadensis*
a. Spurs strongly hooked and shorter; flowers white, pink, or blue. 2. *A. vulgaris*

1. **A. canadensis** L. WILD COLUMBINE.

Dry woodlands and ravine banks, rarely in fields, in sandy, gravelly, or more often stony, acid or neutral soils; common. May–June.

Residual soils of the hills s. of Ithaca; ravine crests and ledges, and the crests of the cliffs along the shore of Cayuga Lake; also in the sandy soils at Junius, and more sparingly elsewhere in leached-out or sandstone soils.

N. S. to Alberta, southw. to Fla. and Tex., including the Coastal Plain; also in the Rocky Mts.

2. **A.** VULGARIS L. GARDEN COLUMBINE.

Roadsides and other grassy places, in rich gravelly soils; occasional. June.

Roadsides w. and n. of Danby; Newfield, in woods w. of the railroad station (*D.*); road n. of Cayuta Lake (*D.*); Saxon Hill, near Taber's (*D.*); s. of Buttermilk Glen; road on Dryden-Lansing town line (*D.*); road to Ellis Hollow; road n. e. of Duck Lake.

Escaped from cultivation. Native of Eu.

[Delphinium (Tourn.) L.]

[**D.** AJACIS L. (*D. consolida* of Cayuga Fl., probably.) LARKSPUR.
Occurs occasionally on garbage dumps.]

2. Cimicifuga L.

1. **C. racemosa** (L.) Nutt. BLACK SNAKEROOT. BLACK COHOSH.

Wild banks and the borders of woods, in rich loamy soils; scarce. July.

Almost confined to the region w. of Cayuga Lake: w. of Cayuta Lake, and along the valley n. e. to Mecklenburg; w. of Reynoldsville, Hector; e. side of Cayuta Lake (*D.*); West Hills, Ithaca, in Cliff Park ravine (*D.*); roadside, about one mile s. of Dryden Lake; Lansing, by road e. of Taughannock (Lansing) station (*D.*). [Also at Watkins and around Seneca Lake.]

S. N. E. to Wis., southw. to Ga. and Mo., penetrating the Coastal Plain but rare in that region and not characteristic of it. A plant of the Allegheny Mts.

3. Actaea L.

a. Pedicels stout, in flower 3–6 mm. long; fruit white, rarely dull purple-red; leaves glabrous beneath except for a few hairs on the veins. 1. *A. alba*
a. Pedicels slender, in flower 8–15 mm. long; fruit crimson, rarely white; leaves usually with scattered hairs over the entire lower surface. 2. *A. rubra*

1. **A. alba** (L.) Mill. WHITE BANEBERRY. WHITE COHOSH.

Rich, often rocky, woodlands and wild banks, in loamy, often somewhat sandy, neutral or slightly calcareous soils with humus; frequent. May 10–30.

Bald Hill, Caroline (*D.*); other hills of Caroline; upper Coy Glen; Six Mile Creek (*D.*!); Cascadilla Creek (*D.*!); Fall Creek (*D.*!); Cayuga Heights; Ringwood; woods around McLean Bogs; Freeville woods (*D.*); Salmon Creek ravine; ravine near Elm Beach, Romulus; Paine Creek glen; and elsewhere.

N. S. and e. Que. to Minn., southw. to Ga. and Mo., but rare on the Coastal Plain. A form with dull red fruit (forma *rubrocarpa* Killip, see Rept. N. Y. State Bot., 1921, p. 40) is occasional, as on the pinnacles of Caroline and the hills of Danby and Newfield, and around the McLean Bogs. This may be of hybrid origin.

2. **A. rubra** (Ait.) Willd. RED BANEBERRY. RED COHOSH.

In situations similar to the preceding, possibly in drier and more acid soils; frequent. Apr. 25–May 25; flowering a week earlier than the preceding species.

Danby (*D.*); Bald Hill, Caroline (*D.*); Six Mile Creek (*D.*!); Fall Creek (*D.*!); Renwick slope; McGowan Woods (*D.*); Dryden-Lansing Swamp (*D.*); Paine Creek; Elm Beach, Romulus; and elsewhere.

Lab. to S. Dak., southw. to N. J., Pa., Tenn., and Nebr.; rare on the Coastal Plain.

Plants with white fruit (forma *neglecta* (Gillman) Robinson) are occasional, and are probably albinos.

4. Trollius L.

1. **T. laxus** Salisb. GLOBE FLOWER.

About marl springs, and in other wet calcareous soils; frequent. May–June 15.

Swamps s. of Key Hill (*D.*!); Danhy (*D.*); Michigan Hollow; Larch Meadow (*D.*!); Ellis Hollow; headwaters of n. branch of Six Mile Creek; Fir Tree Swamp between Slaterville and Dryden; n. e. of Etna; swamp near Freeville (*D.*!); Mud Creek, Freeville (*D.*!); Malloryville (*D.*!); Beaver Brook springs (*D.*!); West Dryden (*D.*); near Benson Corners; and elsewhere.

W. Conn. to Mich., southw. to Del. and Pa., and in the Rocky Mts.; rare or absent on the Coastal Plain.

5. Coptis Salisb.

1. **C. trifolia** (L.) Salisb. GOLDTHREAD.

In humus, especially under hemlocks and on old stumps about swamps, more rarely in the ravines and on the higher hills; frequent. May 10–30.

Headwaters of Dry Run, Spencer; hill s. w. of West Danby; s. of Key Hill; Enfield Glen; Larch Meadow; woods near Eddy Pond (*D.*); Ringwood; Woodwardia Bog; Malloryville Bog; McLean Bogs; Six Mile Creek (*D.*); Beaver Brook; Junius peat bogs.

Lab. to Alaska, southw. to Md., Mich., and n. e. Iowa, and in the mts. to N. C. and Tenn.; infrequent on the Atlantic Coastal Plain.

6. Caltha (Rupp.) L.

1. **C. palustris** L. MARSH MARIGOLD. COWSLIP.

Springy and marshy open places and on the borders of swamps, in neutral or slightly acid mucky soils; locally abundant. Apr.–May.

Common throughout the basin except in the lower Inlet Valley and about the larger marshes.

Lab. to Sask., southw. to S. C., Tenn., and Nebr.; infrequent on the Coastal Plain.

7. Hydrastis Ellis

1. **H. canadensis** L. GOLDEN SEAL.

Rich woodlands; occasional. May.

Woods, Caroline (*S. H. Graham*); Six Mile Creek, near Sulphur Springs, 1872 (*D.*); e. edge of Hector; one-half mile s. w. of Interlaken (*Graham*); n. e. of Hayt Corners (*Graham*); Genoa (*Graham*); East Genoa (*Miss E. M. Tupper*); woods beyond Venice (*Graham*); head of Salmon Creek, n. e. of Merrifield station, 1880 (*D.*); Big Gully (Herb. Mrs. Brun, *D.*); Ledyard (Herb. J. J. Thomas, *D.*).

W. N. E. to Minn., southw. to Ga., Mo., and Kans.; rare or absent on the Coastal Plain. A plant of the rich soils of the interior.

8. Ranunculus (Tourn.) L.[16]

a. Flowers white; petals with no scale over the nectary at base; achenes wrinkled; floating (sometimes stranded) aquatics with dissected leaves.
  b. Leaves short, very closely sessile, strongly clasping, subrigid; peduncles stout; styles 1 mm. long in fruit. 1. *R. longirostris*
  b. Leaves longer, less closely sessile, not clasping, rigid or flaccid; peduncles at flowering time averaging longer and more slender; petals slightly narrower; style obsolete or nearly so. 2. *R. aquatilis*, var. *capillaceus*
a. Flowers yellow; petals with a scale at base; achenes wrinkled; floating (sometimes stranded) aquatics with the immersed leaves dissected (see also 3d *a*). 3. *R. delphinifolius*
a. Flowers yellow; petals with a scale at base; achenes not wrinkled; terrestrial plants.
  b. Achenes striate, thin-walled; plants very low, scapose, spreading by runners; leaves suborbicular, crenate; flowers very small. 4. *R. Cymbalaria*
  b. Achenes smooth, not striate, thicker-walled.
    c. Flowers small, 1 cm. in diam. or less.
      d. Plant glabrous.
        e. Leaves linear, entire; plant creeping, rooting at the nodes. 5. *R. reptans*, var. *ovalis*
        e. Leaves, at least the basal ones, suborbicular, crenate; plant erect.
          f. Basal leaves lobed or parted; stems stout, hollow; achenes 0.8–0.9 mm. in diam.; heads oblong, very-many-fruited. 6. *R. sceleratus*
          f. Basal leaves mostly not lobed; stems slender; achenes 1.2–1.7 mm. in diam.; heads subglobose, few-fruited. 7. *R. abortivus*
      d. Plant hirsute.
        e. Styles hooked in fruit; heads subglobose; leaf divisions sessile. 8. *R. recurvatus*
        e. Styles straight or nearly so; heads oblong; terminal division of the leaf stalked. 9. *R. pennsylvanicus*
    c. Flowers large, 1.5–2.5 cm. in diam.
      d. Styles in fruit 1 mm. long or longer, straight or more or less recurved.
        e. Petals narrowly obovate or oblong; achenes 2–2.6 mm. in diam.; plants not stoloniferous, all elongated branches terminated by flowers; more or less silky villous plants of dry soil.
          f. Roots much thickened, fleshy; cauline and later radical leaves pinnately cleft or divided, the lobes or divisions narrow, linear-lanceolate. 10. *R. fascicularis*
          f. Roots scarcely thickened; leaves palmately or pedately 3-cleft or divided, the lobes or divisions broad, oval or obovate to oblanceolate. 11. *R. hispidus*, var. *falsus*
        e. Petals broadly obovate; plants stoloniferous, with elongated, prostrate, leafy, flowerless branches; glabrous or hirsute plants, chiefly of moist or wet soil.
          f. Achenes 3–3.4 mm. in diam.; styles nearly straight, more than half the length of the achene; plant glabrous or slightly villous. 12. *R. septentrionalis*
          f. Achenes 2–2.5 mm. in diam.; styles more or less curved, one-half or less than one-half the length of the achene.
            g. Flowers single; leaf divisions cuneate at base, sharply lobed.
              h. Pubescence appressed. 13. *R. repens*

[16] *R. Ficaria* L. has been found near yards where cultivated, but is doubtfully established. It occurs in Cascadilla woods.

h. Pubescence spreading, hirsute. 13a. *R. repens*, var. *villosus*

g. Flowers double; leaf divisions subcordate, crenately lobed. 13b. *R. repens*, var. *pleniflorus*

d. Styles in fruit less than 1 mm. long, recurved.

e. Leaves with terminal division stalked; base of stem swollen, corm-like; sepals reflexed. 14. *R. bulbosus*

e. Leaves with all divisions sessile, palmate; base of stem not swollen; sepals not reflexed. 15. *R. acris*

1. **R. longirostris** Godr. (*R. circinatus* of Amer. authors and of Cayuga. Fl.) WHITE WATER-BUTTERCUP.

In the waters of marshes and bays, in more or less calcareous regions; infrequent. July–Aug.

In the marshes at both ends of Cayuga Lake, and in bays along the shores; also in the Cortland marl ponds (*D.*!), in Dryden Lake, and in a small pond at South Butler.

Vt. to B. C., southw. to Tenn., Iowa, and in the Rocky Mts. to Ariz.; apparently rare or absent on the Atlantic Coastal Plain.

When the ponds at Cortland dry out, and when the water in Dryden Lake is low, the plant grows emersed on the mud. This species is distinct from *R. circinatus* Sibth. of Europe.

2. **R. aquatilis** L., var. **capillaceus** DC. (var. *trichophyllus* of Cayuga Fl.) WHITE WATER-BUTTERCUP.

In the waters of pools, marshes, and bays, but more commonly in streams than the preceding species; infrequent. June 20–July.

Pools in Beaver Brook (*D.*); Red Mill Pond; upper Cascadilla Creek (*D.*). Dudley cites also the following localities: "Pools and bayous of Fall Creek and the marshes near. In the pockets of Cayuga L. cut off by the Cayuga So. R. R. Cayuga marshes, abundant"; however, the plant has not been seen recently in these localities.

N. S. to B. C., southw. to N. C. and Calif., and on the Atlantic Coastal Plain. Occurs in both calcareous and noncalcareous waters.

3. **R. delphinifolius** Torr. (*R. multifidus* of Cayuga Fl. ?*R. flabellaris* Raf.) YELLOW WATER-BUTTERCUP.

Shallow water of ponds, marshes, and ditches, often among cattails, in mucky soils and water containing organic matter; scarce. May 15–June 15.

Near Summit Marsh (*D.*!), and along the railroad, North Spencer; Jennings Pond; Ithaca flats, along Cayuga St. near Renwick (*D.*!); near the glass works (*D.*); West Inlet Marsh (*D.*); Ringwood Swamp; Lockwood Flats, 1827 (Herb. J. J. Thomas, *D.*); Cayuga Marshes; along state road, Montezuma Marshes; marsh e. of Montezuma.

Cent. Me. to Ont. and Mich., southw. to N. C. and Ark., including the Coastal Plain.

When growing emersed where pools have dried out, the plant is very different in appearance, with less finely divided leaves (forma *terrestris* (Gray) Blake, see Rhodora 15: 164, 1913).

4. **R. Cymbalaria** Pursh. SEA-SIDE BUTTERCUP.

Brackish marshes; local. June–Sept.

W. shore of lake opposite Cayuga village; Salt Pond w. of Howland Island; flats e. of Montezuma (*Dr. Gray*, 1831, also *D.*!).

Lab. to N. J. along the coast; also in cent. N. Y., along the Great Lakes, throughout the saline plains of w. U. S., and on the Pacific coast in Alaska and Calif. Found also in Greenland and Eurasia.

5. **R. reptans** L., var. **ovalis** (Bigel.) T. & G. (See Rhodora **19**: 135. 1917. *R. Flammula*, var. *reptans*, of Gray's Man., ed. 7, and of Cayuga Fl.)

Damp sandy shores, with no apparent relation to lime content of the soil; rare. July–Sept.

Appearing along the shores of Cayuga Lake rather sporadically: near Renwick, many years ago, not seen since; s. w. part of Myers Point, 1880 (*D.*); Farley Point and shores near, 1895 and 1918–1919; Cayuga Bridge (Herb. J. J. Thomas, *D.*).

Newf. to the n. w. coast, southw. to n. N. J., Pa., Mich., and in the Rocky Mts. to Colo. Characteristic of sandy acid shores in the Adirondacks and along the Atlantic coast. Found also in Eu.

6. **R. sceleratus** L. CURSED BUTTERCUP.

Open marshy soil or moist alluvial fields probably containing a trace or more of salt; frequent. May–July.

Flats from Buttermilk Creek to Cayuga Lake; Union Springs and Canoga, occasional (*D.*); "frequent on the Cayuga Marshes" (*D.*); w. of Howland Island; salt flats e. of Montezuma; Spring Lake; and elsewhere.

Widely distributed almost throughout N. A. except in the extreme North, nsually in saline situations.

The merest trace of salt in the soils of the Ontario plain is apparently sufficient to establish this plant there.

7. **R. abortivus** L. SMALL-FLOWERED BUTTERCUP.

Scrubby hillsides and along brooks, roadsides, and lowland woods, in light, not strongly calcareous, soils; common. May.

Lab. to Man., southw. to Fla., Ark., and Colo., including the Coastal Plain.

Certain plants occurring on a hillside along the Inlet Valley near the Ithaca-Newfield town line, also s. of the mouth of Coy Glen, on edges of cliffs n. of King Ferry, in low woods on Farley Point, and at Union Springs, are to be referred to var. *eucyclus* Fernald. In this flora, however, the var. *eucyclus* seems to be a summer condition of the typical form.

8. **R. recurvatus** Poir. HOOKED BUTTERCUP.

Sandy bottom lands, rich damp upland woods, and loamy ravine soils; frequent. May–June.

Enfield Glen; Six Mile Creek; Cascadilla Glen; Renwick woods and slope; near the McLean Bogs; Beaver Brook; ravine s. of Willets; and elsewhere. Not found in the heavier nor in the more calcareous soils.

N. S. to Man., southw. to Fla., Ala., Mo., and Kans.; less frequent on the Coastal Plain.

9. **R. pennsylvanicus** L. f. BRISTLY BUTTERCUP.

Low sandy or loamy ground, with no apparent reference to lime content; frequent. July–Aug.

Jennings Pond; Newfield; various places on the flats about Ithaca and along Cayuga Lake; Taughannock Point; moor of Phillips Pond; near Crusoe Lake; and elsewhere.

Newf. to B. C., southw. to Ga., Kans., and Colo.; infrequent or rare on the Atlantic Coastal Plain.

10. **R. fascicularis** Muhl. (*R. fascicularis*, first form, of Cayuga Fl.) EARLY WOODS-BUTTERCUP.

Dry hillsides and thinly wooded slopes, apparently in nearly neutral soils; rare. Apr. 10–May 20.

Dudley's statement as to the frequency of this species is not clear. In recent years, at least, it has been known only from above the lake cliffs between McKinneys and Esty, where it is common.

E. Mass. to Ont., Wis., and Man., southw. to N. C., Tex., and Kans.; rare or absent on the Coastal Plain.

The fusiform fleshy roots often decay at flowering time, and hence may easily escape notice.

11. **R. hispidus** Michx., var. **falsus** Fernald. (See Rhodora **22**: 30. 1920. *R. fascicularis*, second form, of Cayuga Fl.) EARLY WOODS-BUTTERCUP.

Hillsides and thinly wooded slopes, on sandy, gravelly, or stony, acid or neutral, soils; frequent. Apr. 10–May 20.

Characteristic of the chestnut and oak woodlands: Enfield Glen; Inlet Valley slope near Lick Brook; Beebe Lake; Cascadilla woods; Renwick slope; McGowan Woods; Shurger Glen; Salmon Creek; and elsewhere; rare or absent in the heavy soils and in the calcareous gravels of the McLean district.

Vt. and Ont. to N. Dak., southw. to Ga. and Ark., including the Coastal Plain.

12. **R. septentrionalis** Poir. SWAMP BUTTERCUP.

Swales and wet woods, mostly on rich mucky soils, with little reference to lime content; frequent, and locally abundant. May–June.

S. w. of Key Hill; Ithaca flats; Renwick; Ringwood; Malloryville; Beaver Brook; Salmon Creek; and elsewhere.

N. B. to Man., southw. to Ga. and Kans.; infrequent on the Coastal Plain.

13. **R.** REPENS L. CREEPING BUTTERCUP.

Damp shady roadsides, damp banks around swamps, also in lawns, in various soils; scarce. June–July 15.

The typical form, as defined by Fernald, occurs in the lawn of the Sawyer residence, Mitchell St., Ithaca; the lawn of the Veterinary College; along roadsides from Spring Lake to Savannah; on the border of cattail marshes at Union Springs; and probably elsewhere.

Newf. to Ont. and B. C., southw. to Va., especially near the coast. In the East, at least, naturalized from Eu.

The dwarf lawn forms of both this and var. *villosus* are strikingly different in general appearance from the more robust types, but no important structural differences have been found.

13a. **R.** REPENS L., var. VILLOSUS Lamotte. (See Rhodora **21**: 169. 1919.)

In dry soil; occasional. June.

Lawns, Quarry St., Ithaca; waste soil, Myers Point.

Adventive or perhaps naturalized from Eu.

13b. **R.** REPENS L., var. PLENIFLORUS Fernald. (See Rhodora **21**: 169. 1919.)

Damp roadsides, ditches, and yards; occasional. June.

Escaped from cultivation: near Danby village; McLean station; between Interlaken and Lodi.

This is probably the double-flowered variety of *R. bulbosus* mentioned by Dudley as occasionally escaping near gardens, as at McLean. It is not known in the wild state. In general appearance it resembles *R. repens* very little and may be specifically dist[illegible]

14. **R. bulbosus** L. BULBOUS BUTTERCUP.

Sandy fields and banks, in acid or neutral soils; scarce. May 15–June 15.

Sporadic plants have been found near Six Mile Creek (*Miss A. G. Mekeel*), near gravel beds at mouth of Fall Creek, and at Venice Center (*A. H. Wright*). The species is more firmly established in Paine Creek glen (*D.*!), at Aurora near the railroad (*D.*), near Scipioville (abundant), on Howland Island, and along the road between West Junius station and the marl ponds.

N. E. to N. Y., southw. to N. C., Tenn., and La. So abundant on the Coastal Plain and in the acid soils of N. E. as to paint the fields yellow when in flower. Naturalized from Eu.

15. **R. acris** L. TALL FIELD BUTTERCUP.

Fields and roadsides, in various soils, chiefly heavy and moist; very common. May–Oct., mostly June 15–July 15.

Newf. to B. C., southw. to Va. and Mo., including the Atlantic Coastal Plain. Naturalized from Eu.

The var. *Steveni* (Andrz.) Lange, with the leaf divisions broad, cuneate-obovate, and slightly incised, is occasional. This seems to be in some cases merely a juvenile form of the normal plant; in other cases it may represent leaf variation in individual plants.

Along the coast there are two periods when the fields are yellow with buttercups: an early one due to the flowering of *R. bulbosus*, and a later period when *R. acris* is in flower.

9. Thalictrum (Tourn.) L.

a. Foliage not glandular and not heavy-scented; leaflets thin, slightly veiny, the margins nearly flat.
  b. Filaments capillary, strongly drooping; flowers greenish yellow or greenish purple, dioecious, vernal; petioles of the cauline leaves well developed; plant 3–7 dm. high. — 1. *T. dioicum*
  b. Filaments clavate, ascending or spreading until after anthesis; flowers white, rarely purplish, less completely dioecious, aestival; petioles of the cauline leaves very short; plant 5–26 dm. high.
    c. Achenes glabrous. — 2. *T. polygamum*
    c. Achenes pubescent. — 2a. *T. polygamum*, var. *hebecarpum*
a. Foliage conspicuously glandular, heavy-scented; leaflets firm, veiny, with revolute margins; filaments capillary or slightly thickened; petioles and habit as in the preceding species. — 3. *T. revolutum*

1. **T. dioicum** L. EARLY MEADOW RUE.

Dry rocky and gravelly soils, and along ravine banks, in neutral or slightly alkaline soils; frequent, and generally distributed. Apr. 20–May 15.

Mostly absent from the chestnut-vaccinium woods, as it is not a plant of acid sands.

Cent. Me. to Sask., southw. to Ala. and Mo.; rare on the Coastal Plain and not characteristic of that region.

2. **T. polygamum** Muhl. MEADOW RUE.

Swamps and meadows, in various soils; common. July.

Newf. to Ont. and Ohio, southw. to Fla., including the Coastal Plain.

House would adopt the name *T. canadense* Mill. for this plant, but both *T. canadense* Mill. and *T. Cornuti* L. were founded on Cornut's plate, with regard to which see Gray's Synopt. Flora, vol. 1, pt. i, p. 18. 1895.

2a. **T. polygamum** Muhl., var. **hebecarpum** Fernald.
In situations similar to the preceding; scarce.
Renwick; Taughannock Point.
Newf. to Ont., southw. to N. H. and N. Y.

3. **T. revolutum** DC. (*T. purpurascens* of Cayuga Fl.?)
Sandy banks and open sandy woods; rare. June 10–30.
Scrubby bank and near-by woods along road about ¾ mile s. w. of Pout Pond, growing with *Monarda punctata,* 1919 (*K. M. W., A. J. E., & L. F. Randolph*); one plant in field at Esty's, 1922; "scarce, in Fall Cr. and elsewhere" (*D.*). Not seen since at the last-named station, and the record is probably an error as this species would not be expected in the locality cited.
Mass. to Ont., southw. to S. C., Tenn., and Ind., including the Coastal Plain.

10. Anemonella Spach

1. **A. thalictroides** (L.) Spach. RUE ANEMONE.
Dry open woodlands and banks, in noncalcareous gravel, clay-gravel, or stony soil; common. Apr.–May 30.
Common about the ravines and on the slopes of Cayuga Lake, occasional on the higher hills, and rare or absent in the McLean region.
S. N. H. and e. Mass. to Ont. and Minn., southw. to Fla., Tenn., and Kans.; less common on the Coastal Plain.
Abnormal forms, with flowers double or wholly green, occur occasionally.

11. Anemone (Tourn.) L.

a. Achenes densely woolly; plants tall, with petioled cauline leaves.
b. Divisions of the cauline leaves 3–5 cm. long, cleft into rather narrow segments; heads of fruit cylindrical, very woolly, only the tips of the styles showing. 1. *A. cylindrica*
b. Divisions of the cauline leaves 6–10 cm. long, much less finely cleft; heads of fruit ovoid or oval, less woolly, the outlines of the achenes showing. 2. *A. virginiana*
a. Achenes not woolly.
b. Plants tall, 25–60 cm. high, several-flowered; cauline leaves sessile; achenes flat, suborbicular, wing-margined, with straight or curved beaks. 3. *A. canadensis*
b. Plants low, 8–20 cm. high, one-flowered; cauline leaves slender-petioled; achenes subterete, oblong, with hooked beaks. 4. *A. quinquefolia*

1. **A. cylindrica** Gray.
Dry open woods and banks, in sandy soils; rare. June.
Sandy crest of Salmon Creek ravine, e. of Five Corners; roadside, Sherwood to Auburn, 1880 (*Miss I. Howland,* D.); near Lowery Ponds and near Vandemark Pond.
W. Me. and e. Mass. to Sask., southw. to n. N. J., Pa., Ill., Mo., Kans., N. Mex., and Ariz.
In sandy acid soils in the Cayuga Lake Basin, but apparently rare on the Coastal Plain. Taylor (Fl. Vic. N. Y.) says, "most common on limestone."

[**A. riparia** Fernald.
Fernald cites this species from Tompkins Co. (see Rhodora **19**: 139. 1917), but the authors have been unable to detect it here.]

2. **A. virginiana** L. TALL ANEMONE.

Dry rich gravelly or loamy banks, in nearly neutral soils; frequent. July.

E. slope of Thatcher Pinnacles; Slaterville; roadside, foot of Enfield Glen; ledges and hillsides in Coy Glen; Six Mile Creek; Fall Creek, above Forest Home; near C. U. campus; Cayuga Heights; near Malloryville Bog; woods n. of Esty Glen; Paine Creek; Union Springs; sandy banks and roadsides, Junius ponds; and elsewhere.

Me. and s. Que. to Minn., southw. to Ga. and Ark.; less frequent on the Coastal Plain.

A form with thinner, broader, white sepals (forma *leucosepala* Fernald, see Rhodora **19**: 140, 1917, *A. virginiana*, var. *alba*, of Cayuga Fl.) is frequent in similar situations, and flowers somewhat earlier, June 20–July 30. This plant may be the basis of the report of *A. riparia* in the Cayuga Lake Basin.

3. **A. canadensis** L. (*A. dichotoma* of Cayuga Fl.) ANEMONE.

Low banks and shores, in rich, more or less calcareous, bottom-land gravels; locally abundant. June 10–July 20.

Banks on the Ithaca flats; shores of Cayuga Lake at many places; Black Lake; shore of pond at Butler Center; salt marsh n. of Montezuma; "creek-beds" (*D.*).

E. Que., cent. Me., and w. N. E. to Alberta, southw. to Md., Mo., Kans., and Colo.; rare on the Coastal Plain.

4. **A. quinquefolia** L. (*A. nemorosa* and var. *quinquefolia* of Cayuga Fl.) WOOD ANEMONE.

Dry or damp sandy wooded banks, if not too calcareous; frequent. May 1–20.

Negundo Woods (*D.*); Six Mile Creek (*D.!*); Fall Creek, above Forest Home; Taughannock Gorge; and elsewhere; rare in the McLean region and in the heavier soils.

N. S. to Minn. and the Rocky Mts., southw. to Ga. and Tenn., including the Coastal Plain.

This species and *Anemonella thalictroides* are almost the only members of the large group of early spring woods flowers so profusely carpeting the forest floor in central N. Y., which are also found abundantly in similar situations on the Coastal Plain.

12. **Hepatica** (Rupp.) Mill.

a. Involucral bracts, and lobes of the leaves, obtuse. 1. *H. americana*
a. Involucral bracts, and lobes of the leaves, acute. 2. *H. acutiloba*

1. **H. americana** (DC.) Ker. (See Rhodora **19**: 45. 1917. *Anemone Hepatica* of Cayuga Fl. *H. triloba* of various authors.) HEPATICA. LIVERLEAF. LIVERWORT.

Dry open woods and banks, in gravelly or stony subacid or neutral soils; common. Mar. 25–May 15.

In the chestnut soils of the hills w., s., and s. e. of Ithaca, and along the ravine crests and the lake slopes in the more sterile soils; scarce in the McLean region.

N. S. to Minn. and Man., southw. to Fla. and Mo.; occasional on the Coastal Plain.

Flowers typically blue. The white form is forma *candida* Fernald (see Rhodora **19**: 45, 1917), and the rosy form is forma *rhodantha* Fernald.

2. **H. acutiloba** DC. (*Anemone acutiloba* of Cayuga Fl.) HEPATICA. LIVERLEAF. LIVERWORT.

Dry open woods and banks, but in rich calcareous loamy soils and leaf mold; common. Mar. 25–May 15.

Six Mile Creek; Fall Creek (*D.*!); Taughannock Gorge (*D.*!); Salmon Creek; Big Gully (*D.*!); Paine Creek; common in the McLean region; rare or absent on the sterile southern hilltops and along the sterile eastern slopes of Cayuga Lake.

W. Que. and w. N. H. to Minn., southw. to Ga. and Mo.; rare or absent on the Coastal Plain and in the sterile parts of N. E. A plant of the rich lands of the interior.

13. Clematis L.

a. Flowers cymose-paniculate, 2 cm. in diam., white. 1. *C. virginiana*

a. Flowers solitary or few, 5–7.5 cm. in diam., purple; outer stamens enlarged and petaloid; leaflets less toothed. 2. *C. verticillaris*

1. **C. virginiana** L. VIRGIN'S BOWER. WHITE CLEMATIS.

River banks, thickets, and swamps, in rich sandy loam; frequent. July 20–Aug.

Frequent along the banks of the Inlet; Ithaca flats; along the larger streams; and elsewhere.

N. S. to Man., southw. to Ga., Tenn., and Mo., including the Coastal Plain but less common there.

2. **C. verticillaris** DC. PURPLE CLEMATIS.

Cliffs and ravines, in calcareous soils; scarce. May 10–30.

Buttermilk Glen, near "Pulpit-Rock" (*D.*!); Cascadilla Glen, w. of campus bridge (*D.*!); Fall Creek, below the suspension bridge (*D.*!); McKinney Twin Glens (*D.*); n. of Esty Glen (*D.*); Taughannock Gorge, above the falls (*D.*!) and e. of the sanatorium.

E. Que. to Hudson Bay and Man., southw. to Del., W. Va., N. C., Mich., and Minn.; rare or absent on the Coastal Plain.

50. MAGNOLIACEAE (MAGNOLIA FAMILY)

a. Carpels follicular; anthers introrse; leaves acute. 1. MAGNOLIA

a. Carpels samaroid; anthers extrorse; leaves truncate and lobed. 2. LIRIODENDRON

1. Magnolia L.

1. **M. acuminata** L. CUCUMBER TREE.

Woodlands, in rich light loamy soils; frequent. May 20–June 10.

Frequent in the woods of Enfield and Newfield (*D.*); Danby, abundant in Durfee Hill woods, also elsewhere (*D.*); Brookton; Caroline; upper Buttermilk Reservoir, fine trees; Six Mile Creek valley (*D.*!); Renwick slope; Cascadilla Creek, above Judd Falls (*D.*!); McGowan Woods (*D.*!); Turkey Hill; Dart Woods (*D.*); Ringwood (*D.*!); rare in the low ground of Freeville and McLean; "only occasional in the damp woods from Forest-Home north through Groton, Genoa, to Sherwood and Big Gully Brook, and on the west side of Cayuga L." (*D.*); s. of Mud Pond, Conquest.

Cent. N. Y. to Ont. and Ill., southw. to Ga., Miss., and Ark. A tree of the west slope of the Allegheny Mts. and of the Mississippi Valley.

2. Liriodendron L.

1. **L. Tulipifera** L. TULIP TREE. WHITEWOOD. YELLOW POPLAR.

Woodlands, in rich light loamy soils; frequent. June 1–20.

Occurrence much as in the preceding species, but more frequent: Enfield Glen; Six Mile Creek; woods near old Armory (*D.*!); back of Sibley College (*D.*!); Fall Creek, above Forest Home; s. of Big Gully (*D.*); Howland Island; Marengo; and elsewhere.

Cent. Mass. to Ont. and Wis., southw. to Fla., Miss., and Ark. This species apparently tolerates more acid and more sterile soils than the preceding one, and its range extends onto the Coastal Plain.

51. MENISPERMACEAE (MOONSEED FAMILY)

1. Menispermum (Tourn.) L.

1. ***M. canadense*** L. MOONSEED.

Rich light soils in ravines and alluvial woods and on banks, more commonly in somewhat calcareous soils; infrequent. June.

Negundo Woods (*D.*); Six Mile Creek (*D.*!); Renwick woods (*D.*!); Cascadilla Glen (*D.*!); Fall Creek (*D.*!); mouth of Pleasant Grove Brook; slough s. w. of Chicago Bog, abundant; s. w. of Mud Pond, Conquest; and elsewhere.

W. Que. and w. N. E. to Man., southw. to Ga., Ark., and Nebr.; less frequent on the Coastal Plain.

52. BERBERIDACEAE (BARBERRY FAMILY)

a. Petals 6–9; stamens 8–18; fruit many-seeded; herbs.
- *b.* Anthers opening longitudinally; fruit a large berry; leaves palmately 5–9-lobed. 1. PODOPHYLLUM
- *b.* Anthers opening by uplifting valves; fruit a circumscissile pod; leaves of 2 obliquely ovate leaflets. 2. JEFFERSONIA

a. Petals and stamens 6; fruit few-seeded.
- *b.* Herbs; leaves ternately decompound; flowers purplish green, with very short thick petals; the 2 blue seeds maturing naked. 3. CAULOPHYLLUM
- *b.* Shrubs; leaves simple, spiny-toothed; flowers yellow, the petals slightly shorter than the sepals; fruit a 1–few-seeded red berry. 4. BERBERIS

1. Podophyllum L.

1. **P. peltatum** L. MAY APPLE. MANDRAKE.

Rich woods and banks, in gravelly loamy soils; not uncommon. May 20–June 10.

Not common immediately about Ithaca, but more frequent toward Dryden and McLean, and in this flora largely a plant of the calcareous gravels, avoiding both acid soils and heavy clays: mouth of Enfield Glen; South Hill; Six Mile Creek; in ravines, Renwick slope; Fall Creek, above Forest Home; Elm Beach, Romulus; and elsewhere.

W. Que and w. N. E. to Minn., southw. to Fla., La., and Tex.; infrequent on the Coastal Plain.

2. Jeffersonia Barton

1. **J. diphylla** (L.) Pers. TWINLEAF.

Open woods and banks, in rich lake-bottom soils of the Ontario plain and its southward extensions; rare. May 1–20.

Bank at n. end of pond hole n. of Wood Mill station, abundant, growing with *Carex Careyana* and *C. tetanica,* 1881 (*Dr. C. Atwood, D.*!); Paine Creek glen, 1883 (*Prof. French*!); near Aurora, 1841 (*Dr. Alex. Thompson*); "about two miles south-east of Levanna, near the east branch of Barber's Brook, in rich woods just west of the V. C. Deshong place; . . . 1882" (*D.*); near Levanna, near Barber Brook and about a mile from the lake, apparently, 1827 (*J. J. Thomas* Herb.); Big Gully (*W. W. Rowlee*).

N. and cent. N. Y. to Wis., southw. to Va., Tenn., and Iowa. A plant primarily of the rich lands of the Ohio Valley.

3. Caulophyllum Michx.

1. **C. thalictroides** (L.) Michx. BLUE COHOSH.

Rich woodlands, in loamy soil with humus over calcareous gravels; frequent. Apr.–May.

Caroline hills; Danby (*D.*), Six Mile Creek; Fall Creek; McLean; Wood Mill station; and elsewhere; rare in the acid sandy regions.

N. B. to Man., southw. to S. C., Tenn., and Mo.; rare or absent on the Coastal Plain. A plant of the rich lands of the interior.

4. Berberis (*Tourn.*) L.

1. **B.** VULGARIS L. COMMON BARBERRY.

Gravelly and stony hillside pastures and fence rows, in poor subacid soils; scarce. May 20–June 15.

Valley near "Rosedale" (*D.*); Danby, on Michigan Hill (*D.*); South Hill, near the "Incline" (*D.*!); road to Buttermilk Falls (*D.*!); lane w. of Negundo Woods (*D.*); Six Mile Creek ravine; near East Ithaca station; road n. of Forest Home (*D.*); near Woodwardia Bog; Cayuga Heights; Ludlowville, near Hedden and Townley Creeks (*D.*) and Moore Creek.

Escaped from cultivation in the Eastern and Central States. Naturalized from Eu.

53. LAURACEAE (LAUREL FAMILY)

a. Anthers 4-celled, 4-valved; flowers 8–10 mm. in diam., in terminal corymbose cymes; leaves palmately veined and usually lobed. 1. SASSAFRAS

a. Anthers 2-celled, 2-valved; flowers 5 mm. in diam., in close axillary heads; leaves pinnately veined and entire. 2. BENZOIN

1. Sassafras Nees

a. Mature leaves and growth of the season hairy. 1. *S. officinale*

a. Mature leaves and growth of the season glabrous, often glaucous. 1a. *S. o.*, var. *albidum*

1. **S. officinale** Nees & Eb. (See Rhodora **20**: 98. 1918. *S. variifolium* of Gray's Man., ed. 7. *S. officinale,* in part, of Cayuga Fl.) SASSAFRAS.

Dry scrubby banks, in sandy or gravelly subacid soils; frequent. May 20–June 10.

In the acid chestnut soils of Danby, Caroline, and Dryden, along the crests of many of the ravines, as Enfield and Coy Glens, and in the sandy woods of Junius; "a large tree grows beyond the Fleming S[chool] H[ouse] and middle-sized ones near upper part of Geer's Gulf" (*D.*).

S. Me. to Mich., southw. to Fla., Tex., and Iowa, including the Coastal Plain.

1a. **S. officinale** Nees & Eb., var. **albidum** (Nutt.) Blake. (See Rhodora **15**: 14, 1913, and **20**: 98, 1918. *S. officinale,* in part, of Cayuga Fl.)

In situations similar to the preceding; frequent.

Connecticut Hill; Six Mile Creek; near Ithaca City Hospital; Turkey Hill; around the Junius peat bogs.

W. N. E. to N. C. in the mts.; rare on the Coastal Plain.

This may be simply an extreme of the typical form, and not a distinct race. It often grows with the typical plant.

2. Benzoin Fabric.

1. **B. aestivale** (L.) Nees. (*Lindera Benzoin* of Cayuga Fl.) SPICE BUSH.

Thickets on low ground, in sandy, often alluvial, acid or slightly alkaline soils; common. Apr. 20–May 10.

Inlet Marshes; Six Mile Creek; Fall Creek; Taughannock Gorge; Turkey Hill; near Mud Pond, Conquest; rare or absent in the McLean region.

S. Me. to Ont. and Mich., southw. to Ga., Tenn., and Kans., including the Coastal Plain.

54. PAPAVERACEAE (POPPY FAMILY)

a. Capsule 2–several-valved, generally elongated; stigma not discoid.
  b. Petals 8–12, white; plant scapose; juice red; leaves palmately lobed. 1. SANGUINARIA
  b. Petals 4, yellow; plant caulescent.
    c. Stigmas 2; calyx of 2 sepals; receptacular flange under calyx wanting; plant somewhat hairy; juice orange-colored; leaves coarsely pinnatifid. 2. CHELIDONIUM
    c. Stigmas 4–6; calyx cap-shaped; receptacular flange prominent; plant glabrous; juice colorless; leaves ternately dissected. [ESCHSCHOLTZIA]
a. Capsule dehiscent by many pores under the many-rayed discoid stigma, ovoid or subglobose; juice white; leaves pinnatifid. 3. PAPAVER

1. Sanguinaria (Dill.) L.

1. **S. canadensis** L. BLOODROOT.

Dry or moist open woodlands and banks, in rich gravelly or sandy, neutral or slightly alkaline, soils; common. Apr. 15–30.

Inlet Valley; Six Mile Creek; Turkey Hill; Fall Creek; the McLean region; Salmon Creek, above Ludlowville; and elsewhere; abundant throughout Genoa and Venice.

N. S. to Man., southw. to Fla., Ala., Ark., and Nebr.; rare or absent on the Coastal Plain. A plant of the rich lands of the interior.

2. Chelidonium (Tourn.) L.

1. **C.** MAJUS L. CELANDINE.

Damp, usually shady, rich gravelly banks, with little reference to lime content of the soil; frequent. May 20–June 20.

Near Summit Marsh; near Saxon Hill (*D.*); near Larch Meadow (*D.!*); Amphitheater, Six Mile Creek (*D.!*); Ithaca streets and waste places; C. U. campus; and elsewhere.

Cent. Me. to Ont., southw. to N. C.; less frequent on the Coastal Plain. Naturalized from Eu.

[Eschscholtzia Cham.]

[**E.** CALIFORNICA Cham. CALIFORNIA POPPY.

Found as a weed by Cayuga Heights Road, in 1915.

Native of California. Escaped from cultivation.]

3. Papaver (Tourn.) L.

a. Plant glabrate and glaucous; leaves lobed, clasping. [*P. somniferum*]
a. Plant hirsute, green; leaves pinnate, tapering at base. 1. *P. Rhoeas*

[**P.** SOMNIFERUM L. OPIUM POPPY.

Found "by road s. e. of Edgewood, 1875 and 1881" (*D.*); dump, lighthouse road, Ithaca, 1924 (*W. C. Muenscher*).]

1. **P.** RHOEAS L. CORN POPPY.

Springing up frequently in waste places and on rubbish heaps.

Adventive from Eu.

55. FUMARIACEAE (FUMITORY FAMILY)

a. Corolla with two opposite petals spurred or saccate at base; pod several-seeded.
  b. Plant climbing; petals firmly united; corolla spongy, persistent, flesh color, scarcely saccate; seeds not crested. 1. ADLUMIA
  b. Plant low, erect, scapose; petals slightly united; corolla not spongy, deciduous, white or pink; seeds crested. 2. DICENTRA
a. Corolla with but one petal spurred or saccate at base, deciduous.
  b. Pods oblong, several-seeded; seeds crested; flowers purplish green, rose color, or yellow, 10–15 mm. long. 3. CORYDALIS
  b. Pods globular, 1-seeded, indehiscent; flowers deep purple tipped with crimson, 5–7 mm. long. 4. FUMARIA

1. **Adlumia** Raf.

1. **A. fungosa** (Ait.) Greene. (*A. cirrhosa* of Cayuga Fl.)

Rocky woods and burned areas, on calcareous shale and gravel; rare. June.

Foot of Cascadilla Glen, 1873, "not permanent" (*D.*); Fall Creek Gorge, s. side above Stewart Ave. bridge (several collectors); Shurger Glen, s. side on gravel bank near stream (*F. P. Metcalf*). [Rocky thicket between Watkins and Havana (Montour Falls), June, 1884, "apparently indigenous" (*D.*).]

E. Que. to Wis., southw. in the mts. to N. C.

2. **Dicentra** Bernh.

a. Corolla 2-spurred; crest of the inner petals minute; stem from a fleshy, loosely scaly bulb; flowers not fragrant. 1. *D. Cucullaria*
a. Corolla cordate at base; crest of the inner petals conspicuous.
  b. Raceme simple; flowers white; stem from a cluster of yellow pea-like corms; flowers fragrant. 2. *D. canadensis*
  b. Raceme compound; flowers pink; stem from a scaly rootstock. 3. *D. eximia*

1. **D. Cucullaria** (L.) Bernh. DUTCHMAN'S BREECHES.

Woodlands, in deep leaf mold, mostly over gravelly calcareous soils; rather common. Apr. 15–May 10.

Enfield Glen; Inlet Valley woods; Six Mile Creek; Fall Creek (*D.*!); Ellis Hollow; Freeville (*D.*); McLean; Taughannock Gorge; Aurora (*D.*); Union Springs (*D.*!); and elsewhere.

N. S. to Minn., southw. to Ga. and Mo.; rarely invading the Coastal Plain.

The generic name *Dicentra* is retained in the list of *nomina conservanda* of the International Code.

2. **D. canadensis** (Goldie) Walp. SQUIRREL CORN.

In situations similar to the preceding, or perhaps in richer, more alluvial, soils; frequent. Flowering about ten days later than the preceding species.

Along Dry Run, in Newfield Township; Danby (*D.*); abundant on mossy slopes, Enfield Glen; Negundo Woods, especially luxuriant (*D.*); Six Mile Creek (*D.*!); Fall Creek (*D.*); Ellis Hollow; Freeville (*D.*); McLean; Wood Mill station; Taughannock Gorge; Elm Beach, Romulus; Paine Creek (*D.*).

N. S. to Minn., southw. to N. C., Ky., and Mo.; apparently absent on the Coastal Plain.

3. **D. eximia** (Ker) Torr.

Junius (*Sartwell* in Herb., D.); also reported to have been found by Sartwell in Wayne Co., not far from Lyons. Whether these two records represent one or two localities is uncertain. David Thomas is said to have found the species in Scipio, Cayuga Co. For a discussion of the records, see Dudley in *Cayuga Flora*.

Pa., southw. along the mts. to Ga. and Tenn.

3. Corydalis (Dill.) Medic.

c. Flowers purplish green or rose color, yellow-tipped; plant usually strict. 1. *C. sempervirens*
a. Flowers golden yellow; plant diffuse, low; leaves more finely divided, with more acute segments. 2. *C. aurea*

1. **C. sempervirens** (L.) Pers. (*C. glauca* of Cayuga Fl.)

Thin acid or neutral soils on rocky outcrops, especially where fires have occurred; rare. May 15–June 20.

Cliffs on n. side of Fall Creek just above Beebe Lake (*C. O. Upton*, 1878, also *D.*!); still persisting, though in some seasons appearing as though extinct.

Newf. to Alaska, southw. to Ga., Ky., Minn., and Mont., including the Coastal Plain and the acid soils of N. E.

The generic name *Corydalis* is included in the list of *nomina conservanda* of the International Code.

2. **C. aurea** Willd. GOLDEN CORYDALIS.

Damp or dry limy cliffs and talus; rare. May 15–June 10.

Enfield Glen, rocks below Lucifer Falls, n. side (*A. N. Prentiss, 1871*, and *D.*!); "several times it has seemed to have become extinct, but it reappears, and flowers have been collected, 1875, 1882, 1884, 1885" (*D.*). In recent years there has been each season a large patch. The plant also occurs occasionally as a weed on garbage dumps.

E. Que. to Alaska, southw. to Vt., Pa., Wis., and Mo., and in the Rocky Mts. to Ariz.

4. Fumaria (Tourn.) L.

1. **F.** OFFICINALIS L. COMMON FUMITORY.

Damp gravelly soil about gardens and yards; rare. June.

McKinneys, by the L. V. R. R., a few rods s. of the station, 1882 and 1886 (*D.*).

Newf. to Fla. and the Gulf States. Adventive from Eu.

56. CRUCIFERAE (MUSTARD FAMILY)

ARTIFICIAL KEY TO THE GENERA

a. Fruit not more than three times (occasionally five times in Draba) as long as wide.
  b. Flowers white, creamy white, greenish white, or rose-purple.
    c. Fruit flattened parallel with the broad partition.
      d. Pods oblong or elliptical, 5 mm. in diam. or less; flowers white; pubescence stellate.
        e. Seeds many in each cell, wingless; petals cleft or entire; pods glabrous. 1. DRABA
        e. Seeds few in each cell, winged; petals cleft; pods stellate-pubescent. 2. BERTEROA
      d. Pods elliptic-orbicular, 10–30 mm. in diam.; flowers purple; pubescence not stellate. 18. LUNARIA
    c. Fruit turgid, scarcely at all flattened, ovoid or subglobose (see also 3d *c*). 16. ARMORACIA
    c. Fruit flattened at right angles to the narrow partition.
      d. Pods obcordate. 6. CAPSELLA
      d. Pods ovate, oval, or orbicular.
        e. Seeds several in each cell. 4. THLASPI
        e. Seed 1 in each cell. 5. LEPIDIUM
  b. Flowers bright or pale yellow.
    c. Pods flattened parallel with the partition; plant densely stellate-pubescent. 3. ALYSSUM

c. Pods turgid.
d. Leaves entire or obscurely toothed, sagittate; pubescence stellate.
e. Fruit globose, wrinkled, indehiscent, 2.5 mm. in diam. [NESLIA]
e. Fruit obovoid, smooth, dehiscent, 4–5 mm. in diam. 7. CAMELINA
d. Leaves pinnatifid, not sagittate; fruit globose or oblong, scarcely wrinkled; pubescence simple. 14. RORIPA
a. Fruit four to many times as long as wide.
b. Flowers yellow or cream yellow.
c. Apex of fruit beyond valves (1.5) 2 mm. long or more; petals 6–20 mm. long.
d. Petals with dark veins.
e. Pods indehiscent, moniliform, especially when dry; valves without a midrib, not strongly keeled; walls spongy. [RAPHANUS]
e. Pods dehiscent, not moniliform; valves with a strongly keeled midrib; walls not so spongy; leaves or their divisions narrower than in the preceding, more fleshy and more nearly glabrous. [ERUCA]
d. Petals without dark veins; pods dehiscent, thin-walled, moniliform or unconstricted.
e. Racemes bractless.
f. Apex of fruit beyond the valves more than 4 mm. long, or if shorter the leaves thin and often hairy, with dentate lobes. 8. BRASSICA
f. Apex of fruit less than 4 mm. long; leaves semi-succulent, glabrous, with entire or crenate lobes. 17. BARBAREA
e. Racemes leafy-bracted; leaves pinnatifid, with obtuse lobes. 9. ERUCASTRUM
c. Apex of fruit beyond valves 1 mm. long or less; petals 3–10 mm. long.
d. Leaves entire or obscurely dentate (see also Arabis).
e. Leaves oval-oblong, clasping. 10. CONRINGIA
e. Leaves linear-lanceolate, not clasping. 13. ERYSIMUM
d. Leaves pinnatifid.
e. Leaves waxy in texture, shining, glabrous, shallowly crenate; terminal lobe usually obtuse. 17. BARBAREA
e. Leaves usually thin and veiny, more sharply toothed; terminal lobe more commonly acute.
f. Fruiting pedicels thick; valves of the pod with 1–3 ribs. 11. SISYMBRIUM
f. Fruiting pedicels slender; valves of the pod veinless. 14. RORIPA
b. Flowers pure white or purple, rarely greenish or yellowish white.
c. Fruit indehiscent, thick and fleshy, beaked; leaves pinnatifid. [RAPHANUS]
c. Fruit dehiscent, not fleshy, beaked or beakless; leaves divided, dentate, or entire.
d. Leaves palmately divided and cleft. 19. DENTARIA
d. Leaves pinnatifid or undivided.
e. Petals 15–20 mm. long, purple or rarely white; leaves ovate-lanceolate, 9–15 cm. long, sharply denticulate; plants tall. 12. HESPERIS
e. Petals 14 mm. long or less, white or purple-tinged; leaves diverse; plants tall or low.
f. Leaves slightly fleshy, glabrous, obtuse, often crenate, not sagittate.
g. Pods spreading, curved, terete or nearly so; leaves pinnatifid. 15. NASTURTIUM
g. Pods erect or ascending, straight, flattened; leaves pinnatifid or oval-oblong and undivided. 20. CARDAMINE
f. Leaves thin or slightly fleshy, glabrous or hairy, acute or obtusish, entire, serrate or the basal ones subcrenate, sagittate or not sagittate.
g. Pods more than 1.5 cm. long. 21. ARABIS
g. Pods less than 1.5 cm. long. 11. SISYMBRIUM

1. **Draba** (Dill.) L.

a. Petals deeply 2-cleft; plant annual, 2–12 cm. high; fruit obtuse, straight; stigma subsessile. 1. *D. verna*
a. Petals entire; plant perennial, 15–45 cm. high; fruit acutish, twisted; style about 0.5 mm. long. 2. *D. arabisans*

1. **D.** VERNA L. WHITLOW GRASS.

A weed of dry sandy or gravelly paths and slopes, in soils not strongly calcareous; rare. Apr.–May 15.

Cemetery, University Ave., Ithaca, 1878 (*Prof. A. N. Prentiss, D.*!), still persisting below the tool house; wild, s. bank of Big Gully, 1882 (*D.*).

E. Mass. to Minn., southw. to Ga. and Tenn. Naturalized from Eurasia.

2. **D. arabisans** Michx.

Damp or dry shale ledges and crests, in limy situations; rare. May 20–June 10.

First small ravine n. of McKinney Twin Glens, 1881 (*D.*!), still persisting; Esty Glen, along the brook just above the falls, 1871 (*D.*), 1918!, and edge of woods just s. of falls, 1916!. Reported from only about five other stations in N. Y., one being in Erie Co. and the others all in the northern part of the State.

Lab. and Newf. to Ont., southw. locally to Me., Vt., and N. Y. A northern species.

2. **Berteroa** DC.

1. **B.** INCANA (L.) DC.

Dry soil; rare. July 15–Aug.

Well established on roadside bank, between West Danby and North Spencer, 1920.

Me. to Minn., southw. to N. J. and Mo. Introduced from Eu.

3. **Alyssum** (Tourn.) L.

1. **A.** ALYSSOIDES L. (*A. calycinum* of Cayuga Fl.)

A weed in dry gravelly or sandy open places; rare. May 20–June 20.

President White Place, C. U. campus, 1878 (*Prof. Prentiss, D.*); "along the road near the Jayne Place" (corner University Ave. and Lake St., Ithaca), 1879 (*F. H. Severance, D.*); Fiske-McGraw (Chi Psi) grounds, 1881 (*F. L. Kilborne, D.*); Lake St., Ithaca, near the gun works, where it has grown for many years.

N. H. and Ont., to Iowa, southw. to Mass. and N. J., also in the Far West. Naturalized from Eu.

4. **Thlaspi** (Tourn.) L.

1. **T.** ARVENSE L. PENNY CRESS. FRENCH-WEED.

A weed in cultivated ground and waste places, in gravelly soils; infrequent. May 20–June.

E. State St. and Harvard Place, Ithaca; Agricultural College campus, in several places; C. U. poultry farm n. of Forest Home; McKinneys; Myers Point.

Que. to Man., southw. to N. Y. and Kans.; common in Canada. Naturalized from Eu.

5. **Lepidium** (Tourn.) L.

a. Cauline leaves not clasping; plant nearly or quite glabrous.
  b. Petals present; pubescence of inflorescence composed of curved acute hairs; rosette leaves lyrate-pinnatifid; embryo accumbent; pods 2.5–3.1 mm. wide. 1. *L. virginicum*
  b. Petals absent; pubescence of inflorescence composed of minute stiff divaricate blunt hairs; embryo incumbent.
    c. Pods oval or obovate, 1.7–2.5 mm. wide; rosette leaves deeply incised-lobed, the lobes outcurved. 2. *L. densiflorum*

c. Pods ovate, 1.8–2.2 mm. wide; rosette leaves 2-pinnately parted, rarely 1-pinnately parted and the lobes incised; odor of plant fetid. [*L. ruderale*]

a. Cauline leaves clasping; plant minutely soft-downy; pods larger. 3. *L. campestre*

1. **L. virginicum** L. PEPPERGRASS.

A weed on dry waste ground and roadsides, if not too sterile; common. June–Oct.
Newf. to Minn. and Colo., southw. to Fla., Tex., and Mex., including the Coastal Plain.

2. **L.** DENSIFLORUM Schrad. (See Thellung, Mon. Lepidium, Mitth. Mus. Univ. Zürich **28.** 1906. *L. apetalum* of Amer. authors, not Willd. *L. ruderale,* at least in part, of Cayuga Fl.) PEPPERGRASS.

A weed in situations and soils similar to the preceding; common. June–Sept.
Me. to Ont. and B. C., southw. to Va., Tex., and Nev. Naturalized from Eurasia.

[**L.** RUDERALE L. FETID PEPPERGRASS.

"With the preceding [*L. virginicum*] and equally common" (*D.*). A Dudley specimen labeled by Dudley *L. ruderale,* in the C. U. Herbarium, is *L. densiflorum. L. ruderale* has not been seen in the Cayuga Lake Basin in recent years.]

3. **L.** CAMPESTRE (L.) R. Br. DOWNY PEPPERGRASS.

A weed on roadsides, in fields, and in waste places, mostly in heavy, often pure clay, soils; becoming common. June–July 15.
"First noticed in Ithaca, 1873" (*D.*).
N. B. and N. S. to Ont. and Kans., southw. to Va., and on the Pacific coast. Naturalized from Eu.

6. **Capsella** Medic.

1. **C.** BURSA-PASTORIS (L.) Medic. SHEPHERD'S PURSE.

A weed by roadsides, in waste and cultivated lands, in gravelly or loamy soils; very common. Mar.–Dec.
Widely distributed over the world. Naturalized from Eu.

7. **Camelina** Crantz

1. **C.** MICROCARPA Andrz. (*C. sativa* of Cayuga Fl.)

Roadsides, waste places, and newly planted fields; rare. May 10–June 20.
Babcock farm, Inlet Valley, 1925 (*W. C. Muenscher*); s. w. of Connecticut Hill, 1924 (*Muenscher*); C. U. campus, 1875 and 1882 (*D.*); new athletic field, 1914; Interlaken, 1915; Aurora, by the railroad (*D.*); rarely elsewhere.
Newf. to B. C., southw. to R. I., Va., Kans., and Ariz. Adventive from Eu.

[**Neslia** Desv.]

[**N.** PANICULATA (L.) Desv. BALL MUSTARD.

A weed in gravelly waste soil; rare. June.
Waste place w. of intersection of Wyckoff Road and Cayuga Heights Road, 1918; doubtfully established.
Que. to Man. and B. C., southw. in the East to Pa. Naturalized from Eu.]

8. **Brassica** (Tourn.) L.[17]

a. Upper cauline leaves clasping or at least with a broad, sessile, rarely broadly cuneate, base; foliage glaucous, glabrous or nearly so, more or less succulent, only in the last species thinner green and setose-hispid; (pedicels, together with the pods, more or less spreading; mature pods 3–11 cm. long, 3–5 mm. wide).

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[17] Compare Bailey, L. H. The cultivated Brassicas. Gentes Herbarum, vol. 1, fasc. 2. 1922.

b. Flowering part of raceme 10–25 cm. long (except toward end of flowering season); petals 13–20 mm. long, pale; sepals somewhat saccate at base, erect; pods rather fleshy, 6–11 cm. long, 4–5 mm. wide; beak 5–10 (13) mm. long, stout, often swollen and 1-seeded, the stigma prominent; upper cauline leaves scarcely clasping, mostly narrowly oblong, obtuse and toothed; root not tuberous. [*B. oleracea*]

b. Flowering part of raceme 2–4 cm. long; petals 5–14 mm. long; sepals not saccate or scarcely so, more spreading; pods less fleshy, 3–8 cm. long, 3–4 (5) mm. wide; beak 8–25 mm. long, more gradual and uniform, without seeds, the stigma less prominent; upper cauline leaves strongly clasping, more acute, entire or toothed.

c. Petals (9) 10–14 mm. long; pod with beak (5) 6–10 cm. long; pedicels ascending; young fruit straight; upper cauline leaves narrowly oblong, barely acute, toothed; root not tuberous; (beak 10–17 mm. long, moderately stout; flowers light yellow). [*B. Napus*]

c. Petals 7–11 mm. long; pod 3–8 cm. long; pedicels spreading; young fruit often somewhat falcately upcurved; upper cauline leaves oblong-lanceolate or ovate-oblong, more acute, entire.

d. Beak 8–15 mm. long, moderately stout; pods 5–6.5 cm. long; flowers light yellow, not conspicuously overtopping the buds; root tuberous. [*B. Napobrassica*]

d. Beak 12–25 mm. long, very slender; pods 3–8 cm. long; flowers bright yellow, overtopping the buds.

e. Foliage glaucous, glabrous or the lower leaves with a few scattered whitish hairs; root slender; petals 8–11 mm. long. 1. *B. campestris*

e. Foliage green, rarely glaucous, more or less setose-hispid; root tuberous; petals about 7 mm. long. [*B. Rapa*]

a. Upper cauline leaves tapering at base; foliage scarcely glaucous, glabrous or hairy, thin; (petals small, 6–14 mm. long, bright yellow; sepals usually spreading; fruiting pedicels spreading or appressed; pods 1–7 cm. long, 1–5 mm. wide).

b. Beak much narrower than body of pod, one-ninth to one-quarter the total length of the fruit, not flattened, seedless; valves 1-nerved or nearly so; pods not constricted.

c. Pods 2.5–7 cm. long, more or less spreading; pedicels 7–10 mm. long; plant low. 2. *B. juncea*

c. Pods 1–2 cm. long, appressed; pedicels 3–7 mm. long; plant tall. 3. *B. nigra*

b. Beak not much narrower than body of pod, one-fourth the total length of the fruit or more, flattened, usually containing a seed in the basal part.

c. Fruiting pedicels 4–7 mm. long, stouter; pods moderately slender, 2 mm. in diam., glabrous or hispid, ascending, scarcely moniliform-constricted; nerves prominent, at least when dry; beak one-fourth to one-third the total length of the fruit; leaves sparingly lyrate, the upper ones usually undivided. 4. *B. arvensis*

c. Fruiting pedicels about 10 mm. long; pods stout, 4 mm. in diam., hispid, spreading at right angles, moniliform-constricted; nerves indistinct; beak very broad and flat, usually more than one-half the total length of the fruit; leaves more lyrate. [*B. alba*]

[**B. OLERACEA** L. CABBAGE AND KALE.

Occasional in fields and on dumps, but probably not spontaneous; commonly cultivated. The plants are very diverse, some probably being cabbage and others various types of kale.

Native of Eu.]

[B. NAPUS L. RAPE.

An occasional weed in cultivated fields and waste places and by roadsides, mostly in gravelly soil, springing up from seeds accidentally sown, or persisting after cultivation.

Native of Eu.]

[B. NAPOBRASSICA (L.) Mill. RUTABAGA. SWEDISH TURNIP.

Fields and waste places, where it occasionally springs up from roots that have wintered over.

Native of Eu.]

1. B. *CAMPESTRIS* L.

Waste places and dumps; occasional. July.

Road n. of Enfield Glen; Ferris Place bridge; athletic field, C. U. campus; lighthouse road.

Widely distributed in N. A. Native of Europe.

[B. RAPA L. TURNIP.

Dumps and waste places, only near Ferris Place bridge. The plant rarely winters over, which accounts for its infrequency.

Native of Eu.]

2. B. JUNCEA (L.) Cosson. INDIAN MUSTARD. LEAF MUSTARD.

A weed in waste places and on dumps; frequent. June–Aug.

North Spencer; various places about C. U. campus and the streets of Ithaca, especially on garbage dumps along the lighthouse road.

Widely distributed, though of recent introduction. Naturalized from Asia.

3. B. NIGRA (L.) Koch. BLACK MUSTARD.

A weed in waste places and along streams and lake shores, usually in rich gravelly soils; common. June–Oct.

Generally distributed throughout the U. S. and Canada, except in the extreme North. Naturalized from Eurasia.

4. B. ARVENSIS (L.) Ktze. (*B. Sinapistrum* of Cayuga Fl.) CHARLOCK. WILD MUSTARD. SUMMER MUSTARD.

A weed in cultivated fields and waste places; locally very abundant, and a bad weed. June–Aug.

Widely distributed in N. A. Naturalized from Eu.

This is the summer mustard of the farmer, especially abundant in oat fields, and maturing later than the spring mustard (*Barbarea vulgaris*).

[B. ALBA (L.) Boiss. WHITE MUSTARD.

A weed of waste places, dumps, and roadsides, springing up from seed accidentally scattered, and apparently not established

Ithaca, Seneca St. (*D.*) and W. State St.; dump along lighthouse road; dump on South Ave., Ithaca, 1893; near Ithaca fair grounds (*W. C. Muenscher*); field e. of Freeville (*D.*)

Native of Eu.]

[**Raphanus** (Tourn.) L.]

a. Flowers white or purplish; pods 2–3-seeded, the seed-bearing part short and thick, at maturity often 10 mm. in diam. [*R. sativus*]

a. Flowers pale yellow (fading to white in herbarium specimens); pods 4–10-seeded, the seed-bearing part longer and more slender, 2–3 mm. in diam., grooved. [*R. Raphanistrum*]

[**R.** SATIVUS L. RADISH.

Springing up occasionally from scattered seeds and roots, but not established. A common garden plant, native of Eurasia.]

[**R.** RAPHANISTRUM L. WILD RADISH. JOINTED CHARLOCK.

Not yet reported in the Cayuga Lake Basin, though it occurs in adjacent Cortland Co. A weedy species, naturalized from Eu.]

[**Eruca** (Tourn.) Adans.]

[**E.** SATIVA Mill. GARDEN ROCKET.

Waste grounds near the Ithaca Gun Works, 1916 (*Miss A. G. Mekeel*); doubtfully established.

Ont. to Pa. and Mo. Adventive from Eu.]

9. **Erucastrum** Schimp. & Spenn.

1. **E.** GALLICUM (Willd.) Schulz. (*E. Pollichii* Schimp. & Spenn.)

A weed in waste places; rare.

South Ave., w. of baseball field, a few plants, 1918 (*L. F. Randolph*), since which time it has persisted; library slope, 1923 (*W. C. Muenscher*); railroad near Barge Canal Terminal, 1925 (*Muenscher*); dump, lighthouse road, 1925 (*Muenscher*); w. of bridge, Montezuma, 1925 (*Muenscher*).

Known in N. A. heretofore from e. Mass. and Wis. Adventive from Eu.

10. **Conringia** (Heist.) Adans.

1. **C.** ORIENTALIS (L.) Dumort. HARE'S-EAR MUSTARD.

A weed of rich soil about farm buildings, and in waste places elsewhere; becoming occasional. June–Aug.

Recently introduced, probably with feed: near Dwyer Pond; about the farm buildings of the Agricultural College; Myers Point.

N. B. and N. S. to Man. and Oreg., southw. to Del., Mo., and Colo. Native of Eu.

11. **Sisymbrium** (Tourn.) L.

a. Leaves mostly cauline, pinnate or pinnatifid.
  b. Stigmas 2-lobed; pubescence, when present, simple; leaves 1-pinnatifid, the teeth sharp.
    c. Pods 1–1.6 cm. long, appressed; petals 2–3 mm. long, bright yellow.
      d. Pods and foliage puberulent. 1. *S. officinale*
      d. Pods and foliage glabrous. 1a. *S. o.*, var. *leiocarpum*
    c. Pods 6–10 cm. long, spreading; petals 5–8 mm. long, pale yellow; leaf segments usually longer and narrower. 2. *S. altissimum*
  b. Stigmas not lobed; pubescence stellate; leaves finely and crenately bipinnatifid; pods 0.7–1 cm. long. 3. *S. brachycarpon*
a. Leaves mostly in a basal rosette, entire or slightly toothed; plant low. 4. *S. Thalianum*

1. **S.** OFFICINALE (L.) Scop. HEDGE MUSTARD.

A weed of yards, waste places, and roadsides, mostly in dry gravelly soil; rare. June–Sept.

C. U. campus, w. of athletic field and near Rockefeller Hall; railroad tracks, McLean.

Local in n. e. U. S. and Canada. Adventive from Eu

1a. **S.** OFFICINALE (L.) Scop., var. LEIOCARPUM DC.

In situations similar to the preceding; common. June–Sept.
Widely distributed in N. A. and S. A. Naturalized from Eurasia.

2. **S.** ALTISSIMUM L. TUMBLE MUSTARD.

A weed in gravelly waste places by roadsides, and more rarely in cultivated fields; frequent. June–Sept.
Widely spread throughout the basin, but especially frequent in railroad yards and on railroad ballast.
N. S. to Ont. and B. C., southw. to Va., Mo., Colo., Utah, and Oreg. Especially abundant in the Northwest. Adventive from Eu.

3. **S. brachycarpon** (Richardson) Wats. (See Rhodora 17: 140. 1915. *S. canescens* of Cayuga Fl.)

Cliffs, probably only in calcareous soils; very rare. June.
"Lucifer Falls, Tompkins Co. *J. W. Chickering*" (Gray's Man., ed. 5. 1867). Dudley says: "I have not been able to find it there, but it grows above the footpath at the entrance of Watkins Glen, (*Dr. Jordan discoverer.*) !". The species has not been seen in recent years, though it has been sought diligently. It is known elsewhere in N. Y. only in the vicinity of Lake Champlain.
Que. to Wash., southw. to Tenn., Ill., Mo., Tex., and Colo.

4. **S.** THALIANUM (L.) J. Gay. MOUSE-EAR CRESS.

A weed in sandy or gravelly waste places, and by roadsides, in acid soils; rare. Apr. 20–May.
Roadside, lower part of state road ascending the hill n. of Enfield Glen, 1913–1920 (*A. J. E. & L. H. MacDaniels*); near Phillips Pond (*K. M. W., A. J. E., & L. F. Randolph*); near Black Brook, Tyre (same collectors).
Mass. and Ont. to Minn., southw. to Ga., Mo., Ark., and Utah. Naturalized from Eurasia.

12. **Hesperis** (Tourn.) L.

1. **H.** MATRONALIS L. ROCKET.

Damp shady stream borders in ravines, and on damp or shady roadsides; occasional. June–July.
Escaped from cultivation: Enfield Glen; road to Buttermilk Falls, 1875 and 1882 (*D.*); near Giles Place (*D.*); Cascadilla Creek; Fall Creek, at lower bridge in Forest Home and below; Ovid; and elsewhere.
Me. to Iowa, southw. to N. C. Native of Europe.

13. **Erysimum** (Tourn.) L.

a. Pods about 2 cm. long, on slender pedicels about 10 mm. long; leaves scarcely toothed. 1. *E. cheiranthoides*
a. Pods 4–10 cm. long, on stout pedicels about 5 mm. long; leaves repand-dentate. 2. *E. repandum*

1. **E. cheiranthoides** L. WORM-SEED MUSTARD.

Dry or sometimes moist shores and banks and on shale ledges, probably in more or less calcareous soils; frequent. June–Sept.
Enfield Glen; Six Mile Creek; near the Old Armory (*D.*); Fall Creek; near the "Nook"; below University Ave.; in cinders, railroad ballast e. of Freeville; e. and w. shores of Cayuga Lake (*D.*!); near pond s. of South Butler; and elsewhere.
Newf. to the Pacific coast, southw. to N. J., Pa., Tenn., and Mo.; apparently infrequent on the Atlantic Coastal Plain. Found also in Eu.

2. **E.** REPANDUM L. TREACLE MUSTARD.

Lawns and waste places; rare. July–Aug.

Collected on the Eames lawn, Highland Road, Ithaca, 1923; new seeding, Babcock farm, Inlet Valley, 1925 (*W. C. Muenscher*); Whetzel yard, Forest Home, 1924 (*M. F. Barrus*).

Occasional in waste places about the eastern seaports, and in the Mississippi Valley. Adventive from Eu.

14. **Roripa** Scop.[18]

a. Pods linear, elongated, 10–25 mm. long. — 1. *R. sylvestris*
a. Pods oblong-linear to globose, 5 mm. long or less.
  b. Pods short-cylindrical; plant nearly glabrous. — 2. *R. palustris*
  b. Pods subglobose; plant hirsute. — 2a. *R. p.*, var. *hispida*

1. **R.** SYLVESTRIS (L.) Bess. (*Radicula sylvestris* of Gray's Man., ed. 7.) YELLOW CRESS.

A weed in moist waste clay, clay loam, or alluvium; frequent. June–Aug. 15.

Several places near the athletic field, C. U. campus; cultivated grounds along the drainage canal near the Ithaca fair grounds; experimental grounds of the Department of Floriculture, Agricultural College; Cayuga Heights; Union Springs.

Newf. to Ont., southw. to Ala., Mich., and Ill. Adventive from Eurasia. Recently introduced in the Cayuga Lake Basin.

2. **R. palustris** (L.) Bess. (*Radicula palustris* of Gray's Man., ed. 7. *Nasturtium palustre* of Cayuga Fl.) MARSH CRESS.

Low open grounds, in rich bottom-land soils, rarely in drier waste soils; frequent. June 20–Sept.

Spencer Lake; Hudson St., South Hill, Ithaca; Cascadilla Glen (*D.*!); Ithaca flats; Cortland marl ponds (*D.*); and elsewhere.

Generally distributed almost throughout N. A. except in the extreme North. Found also in Eurasia.

2a. **R. palustris** (L.) Bess., var. **hispida** (Desv.) Rydb.

In situations similar to the preceding; more frequent.

Summit Marsh (*D.*); Ithaca flats (*D.*!); Ellis Hollow; Cayuga Marshes (*D.*); and elsewhere.

Newf. to Alaska, southw. to Fla. and N. Mex. Found also in Eurasia.

15. **Nasturtium** R. Br.

1. **N.** NASTURTIUM-AQUATICUM (L.) Karst. (*Radicula Nasturtium-aquaticum* of Gray's Man., ed. 7. *Nasturtium officinale* of Cayuga Fl.) WATER CRESS.

Spring-fed brooks, rarely in more quiet waters, with no apparent relation to lime content; frequent, and locally abundant. June–July.

Ditch along road to Slaterville; Cascadilla Creek, above Judd Falls; Cayuga Heights, e. of golf links; Red Mill Pond; McLean; and elsewhere.

Newf. to Man. and Oreg., southw. to Va., Mo., Ariz., and Calif., including the Atlantic Coastal Plain. Naturalized from Eurasia.

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[18] The reasons for rejecting the generic name *Radicula* have been summarized by Sprague (Journ. Bot. 62 : 225, 1924). Mackenzie (Rhodora 27 : 28, 1925, and 27 : 65, 1925) has shown that the name *Sisymbrium* L. should apply to the water cress, but for this plant the name *Nasturtium* was retained as a *nomen conservandum* at the Brussels Congress. *Sisymbrium* is used in its old sense in the present flora, as the proper name for that genus has not been worked out and the necessary combinations have not been made. The three segregates of Roripa — Roripa, Nasturtium, and Armoracia — seem to be as distinct from one another as are many other recognized genera of the Cruciferae.

This plant resembles larger forms of *Cardamine pennsylvanica*, but the pods spread at right angles, and are broader and more curved.

16. Armoracia Gaertn.

a. Pod globose, 2-celled; style very short; plant terrestrial, with large leaves, the lowermost ones often dissected. 1. *A. rusticana*

a. Pod ovoid, 1-celled; style about as long as the pod; plant aquatic, with submerged capillary-dissected leaves. 2. *A. aquatica*

1. **A.** RUSTICANA Gaertn. (*Radicula Armoracia* of Gray's Man., ed. 7. *Nasturtium Armoracia* of Cayuga Fl.) HORSE-RADISH.

Low grounds and ditches, in rich soils; frequent. May–June.

Roadside, South Hill to Danby; Inlet Valley, near Enfield Creek; flats s. and n. of Ithaca; waste places in Ithaca; and elsewhere.

Widespread in e. N. A., where it is naturalized from Eu. It was probably introduced originally because of its value as a condiment.

2. **A. aquatica** (Eaton) Wiegand. (See Rhodora **27**: 186. 1925. *Radicula aquatica* of Gray's Man., ed. 7.) LAKE CRESS.

Shallow water; rare. June 25–July.

Known only from Black Brook, Tyre (*K. M. W., A. J. E., & L. F. Randolph*).

Que. and Vt. to Minn., southw. to Fla., La., and Ark.; rare or absent on the Coastal Plain.

17. Barbarea R. Br.

a. Lateral divisions of the lower leaves 0–4 (5) pairs, the upper leaves rarely pinnatifid; beak slender, 2–3 mm. long; pedicels slender. 1. *B. vulgaris*

a. Lateral divisions of the lower leaves (4) 5–10 pairs, the upper leaves lyrate; beak stout, 0.5–1 (2) mm. long; pedicels as thick as the pod. 2. *B. verna*

1. **B.** VULGARIS R. Br. WINTER CRESS. YELLOW ROCKET. SPRING MUSTARD.

A weed in rich damp cultivated fields, on roadsides, and in waste places, in loamy, gravelly, or clayey soils; very common, often rendering whole fields bright yellow. May–June.

Widely distributed in N. A. Introduced from Europe in the Eastern and Central States, but native in the North and West.

In exposed situations the pods are usually appressed (*B. stricta* of Gray's Man., ed. 7, not Andrz. *B. vulgaris*, var. *longisiliquosa* Fernald, Rhodora 11:139, 1909, and of Carion?), but when growing in the shade or in especially damp situations, the pods are commonly much more spreading. (See Journ. Bot. **54**:202, 1916, and **57**:304, 1919.)

2. **B.** VERNA (Mill.) Asch.

In situations and soils similar to the preceding, or possibly in more sandy or gravelly subacid soils; scarce. May 10–June 15.

Near Key Hill; Caroline; railroad ballast w. and e. of Aurora St. on South Hill, Ithaca; C. U. campus, near baseball cage; Cayuga Heights; Central N. Y. Southern R. R., near Remington Salt Works.

N. Y. to Wash., southw. to Fla. and Calif. Native of Eu.

Originally perhaps an escape from cultivation, where it is infrequently grown for salad.

18. Lunaria L.

1. **L.** ANNUA L. (*L. biennis* of Cayuga Fl.) HONESTY.

Springing up occasionally near old gardens; doubtfully established. May 15–30. Ithaca, near foot of State St. hill and on Dryden Road; "by hedge south side of

Giles Place" (*D.*); Fall Creek, near sand bank above Forest Home (*E. H. Preswick*, D.).

Ont. and Conn. to N. Y. and Pa. Native of Eu.

19. Dentaria (Tourn.) L.

a. Rootstocks continuous; cauline leaves 2, subopposite; leaflets ovate, coarsely toothed; inflorescence glabrous. 1. *D. diphylla*

a. Rootstocks moniliform; cauline leaves usually 3, subverticillate; leaflets oblong-linear or even narrower, incised or laciniate; inflorescence puberulent. 2. *D. laciniata*

1. **D. diphylla** Michx. CRINKLEROOT. TOOTHWORT. PEPPERROOT.

Ravines and rich woodlands, in moist humus underlaid with calcareous gravels or loams, often in alluvium; frequent. May 1–25.

Swamp w. of Key Hill; hillside, Larch Meadow; Negundo Woods; in nearly all the ravines (*D.*!); Ellis Hollow; woods, McLean Bogs (*D.*!).

E. Que. to s. Ont. and Minn., southw. to S. C. and Ky.; rare or absent on the Coastal Plain. A plant of the interior mountain and glaciated belt.

2. **D. laciniata** Muhl. TOOTHWORT. PEPPERROOT.

In situations similar to the preceding, but drier, in more gravelly and sandy soils; common. Apr. 20–May 20.

Enfield Glen; Inlet Valley, especially near Lick Brook and Negundo Woods; Six Mile Creek; Fall Creek; McKinneys to Esty; Taughannock Gorge; and elsewhere.

W. Que. and Vt. to Minn., southw. to Fla. and La.; rare on the Coastal Plain.

Many plants of Dentaria differ in various ways from typical *D. diphylla* and *D. laciniata*. These have been a constant source of difficulty to local botanists. Dudley listed them under his *D. laciniata*, second and third forms, and under *D. maxima*. Some of the specimens fall readily under *D. maxima* as delineated in Gray's Man., ed. 7, but others cannot be placed there with certainty. Field studies through many seasons have led the authors to the belief that these plants are all of hybrid origin, with *D. diphylla* and *D. laciniata* as parents. The leaf divisions vary in width between those of the two parents, and the teeth are more incised than in *D. diphylla* but more crenate than in *D. laciniata*. The leaves are usually three, as in *D. laciniata*, but alternate, as is frequently the case in *D. diphylla*; and the rootstocks are either moniliform, or continuous, or intermediate between these two types. The inflorescence, though usually glabrous, is occasionally hairy, as is also the upper part of the stem. A single colony of plants often contains several types representing various combinations of the characters of typical *D. diphylla* and *D. laciniata*. *D. maxima*, therefore, does not seem to be a true species.

20. Cardamine (Tourn.) L.

a. Leaves undivided; base of stem and rootstocks tuberous-thickened; perennials.

b. Flowers white; stem 1.5–5 dm. high, pubescent at base only, or glabrous. 1. *C. bulbosa*

b. Flowers tinged with purple, sometimes entirely white; stem 1–2.5 dm. high, more pubescent. 1a. *C. b.*, var. *purpurea*

a. Leaves pinnatifid; base of stem, rootstocks, and root slender.

b. Flowers large, 10–15 mm. in diam., often tinged with pink; perennials. 2. *C. pratensis*, var. *palustris*

b. Flowers small, 5 mm. in diam. or less; annuals or biennials.

c. Leaves of 2–6 often broad segments, the terminal ones larger; plants of wet soil. 3. *C. pennsylvanica*

c. Leaves of 5–8 narrow segments, the terminal ones scarcely larger; plants of dry soil. 4. *C. parviflora*

1. **C. bulbosa** (Schreb.) BSP. (*C. rhomboidea* of Cayuga Fl.) SPRING CRESS.

Open marshland, in wet alluvial or mucky soil; infrequent. May 10–30.

Larch Meadow; Indian Spring marsh (*D.*!); Fall Creek, near Varna; meadow n. w. of Dryden Lake; near McLean Bogs; "near Freeville and McLean" (*D.*!).

E. Mass. to Minn., southw. to Fla. and Tex.; infrequent on the Coastal Plain.

1a. **C. bulbosa** (Schreb.) BSP., var. **purpurea** (Torr.) BSP. (*C. Douglassii* of Gray's Man., ed. 7.)

In somewhat drier and more alluvial woodlands than the preceding; frequent, locally very abundant. Apr. 20–May 15.

Around swamp w. of Key Hill; Inlet Valley, both s. and n. of Ithaca, abundant; Caroline Depot; Beech Woods, Six Mile Creek; Fall Creek; Ellis Hollow; along Fall Creek, above Freeville; and elsewhere.

Conn. to s. Ont. and Wis., southw. to Md. and Ky.; rare or absent on the Coastal Plain.

No good characters have been found to separate this from the other form of *C. bulbosa.* The often-cited differences in shape of leaf are not apparent, and there is no constant difference in shape and size of flower, though the flowers of *C. bulbosa* are occasionally smaller. The differences in color of flower, pubescence, height, and time of flowering, are those of degree only, and one or more are frequently not evident. Perhaps color of flower and height are the most constant.

2. **C. pratensis** L., var. **palustris** Wimm. & Grab. (See Fernald in Rhodora 22: 11. 1920.) CUCKOO FLOWER.

Boggy and mucky soil, usually in the vicinity of limy springs; scarce. May 15–June 10.

Larch Meadow (*D.*); Fleming Meadow (*D.*); marsh at head of Cayuga Lake (*Dr. Jordan, D.*); Dryden-Lansing Swamp (*Dr. Jordan, D.*); near Freeville (*D.*); Mud Pond, McLean Bogs (*D.*!); Beaver Brook; swale by railroad w. of Malloryville; Lake Como (Locke Pond, *D.*); swamp e. of Montezuma village, and on Howland Island (*F. P. Metcalf*); Miller Bog, Spring Lake (*L. Griscom*).

Lab. to the n. w. coast, southw. to n. N. J. and Minn.; rare or absent on the Atlantic Coastal Plain. Found also in Eurasia.

Fernald states that this variety has white flowers, as opposed to pink in the typical form of the species. Several of the specimens listed above have flowers strongly purple-tinged.

3. **C. pennsylvanica** Muhl. (*C. hirsuta* of Cayuga Fl.)

Wet places along streams and in swamps; common. May–July.

Lab. to Minn. and Mont., southw. to Fla. and Kans., including the Coastal Plain.

4. **C. parviflora** L. (*C. hirsuta*, var. *sylvatica*, of Cayuga Fl.)

Dry, apparently noncalcareous, mostly sandstone, residual soil on rocks; rare. June.

Esty (Burdick's) Glen and vicinity (*D.*), and on the cliffs s. of the glen (*K.M.W.*).

Que. to Ga., and from the Mississippi Valley to Oreg.; rare or absent on the Atlantic Coastal Plain.

21. **Arabis** L.

a. Seeds in one row.
  b. Seeds oblong or elliptical, very small, wingless.
    c. Leaves tapering at base, often petioled, those of the basal rosette usually pubescent and coarsely toothed or lyrately pinnatifid, the cauline leaves entire; stem low, diffusely branched above. 1. *A. lyrata*
    c. Leaves clasping, glabrous and glaucous, entire; stem tall and strict. 2. *A. glabra*

b. Seeds orbicular, larger, more or less winged.
c. Leaves clasping; pods 1–2 mm. broad, erect or recurved-spreading.
d. Leaves hairy; seeds nearly wingless; pods erect. 3. *A. hirsuta*
d. Leaves glabrous; seeds broadly winged; pods spreading. 4. *A. laevigata*
c. Leaves tapering to a sessile base, pubescent; pods 2.5–4 mm. broad, falcate, pendent. 5. *A. canadensis*
a. Seeds in two rows; leaves abundant on the stem, clasping, glabrous or the basal rosette with a few minute hairs; plant strict; pods 1.5–2.5 mm. broad, erect. 6. *A. Drummondi*

1. **A. lyrata** L. ROCK CRESS.

Dry shaly banks and sandstone or limestone cliffs, with little or no reference to lime content; rare. May 20–July 15.

Caroline, on North Pinnacle (*D.*!); Enfield Glen, rare (*D.*); Fall Creek Gorge, rare (*D.*); "almost wholly wanting on the lake-shore cliffs" (*D.*). [Also, corner of Seneca Lake; Labrador Lake cliffs, Apulia; and at Jamesville.]

Ont. to Man. and Alaska, southw. to Conn., Va., Tenn., and B. C.; rare on the Atlantic Coastal Plain.

2. **A. glabra** (L.) Bernh. (*A. perfoliata* of Cayuga Fl.) TOWER MUSTARD.

Dry gravelly fields and waste places, with no special reference to lime content of the soil; scarce. June–July.

Near Summit Marsh (*D.*); near Headwaters Swamp; roadside above Enfield Falls; gravel delta between Lick Brook and Buttermilk Creek; South Hill, above the quarry (*D.*); Ulysses, near Perry (*D.*); Spring Lake and Mud Pond, Conquest. Appearing as though introduced in this flora.

N. B. to B. C., southw. to n. N. J., Pa., the Great Lakes, S. Dak., Utah, and Calif.; rare or absent on the Atlantic Coastal Plain. Found also in Eu.

3. **A. hirsuta** (L.) Scop.

Dry banks and cliffs in ravines, in calcareous soils; frequent. May 20–June 10.

Enfield Glen (*D.*!); Six Mile Creek (*D.*!); Cascadilla Creek; Fall Creek (*D.*!); Beebe Lake; Taughannock Gorge; lake shore ravines (*D.*).

N. B. to Alaska and B. C., southw. to Ga., Mo., Kans., Ariz., and Calif.; apparently not on the Atlantic Coastal Plain.

4. **A. laevigata** (Muhl.) Poir. ROCK CRESS.

Dry cliffs and banks of the ravines and lake shores, in neutral or calcareous soils; frequent. May 20–June.

In nearly all the ravines of the basin, and on dry banks, in gravelly soil.

W. Me. to S. Dak., southw. to Iowa and Ark.; rare or absent on the Coastal Plain.

5. **A. canadensis** L. SICKLE-POD.

Dry cliffs and banks in ravines and on other rocky slopes, in gravelly or stony, neutral or calcareous, soils; frequent. June–Aug.

Enfield Glen (*D.*!); South Hill (*D.*); Six Mile Creek (*D.*!); Fall Creek (*D.*!); hillside n. of McKinneys; n. of Esty Glen; Taughannock Gorge; lake shore ravines (*D.*); "widely distributed, but growing singly" (*D.*).

E. Mass., Vt., and Ont., to Minn., southw. to Ga., Tex., and Kans.; rare or absent on the Coastal Plain.

6. **A. Drummondi** Gray. ROCK CRESS.

Rocks and shale cliffs, probably in calcareous soils; frequent. June.

In nearly all the ravines of the basin; "especially abundant on the High Cliffs north of King's Ferry" (*D.*).

Lab. to B. C., southw. to N. S., s. N. E., N. Y., Ohio, Ill., Utah, and Oreg.; almost or quite absent on the Atlantic Coastal Plain.

[**A. brachycarpa** (T. & G.) Britton.

House (Bul. N. Y. State Mus. 254: 366. 1924) cites this species from "Fall creek, *F. C. Curtice*. Burdick's glen, Cayuga county, *Dudley*." No specimens from the Cayuga Lake Basin have been seen by the authors.]

57. CAPPARIDACEAE (CAPER FAMILY)

1. Polanisia Raf.

1. **P. graveolens** Raf. CLAMMY-WEED.

Sandy and gravelly shores and waste places; frequent. July.

Points along Cayuga Lake; also gravel bars in the ravines of the basin, occasionally on railroad ballast and roadsides.

W. Que. to Man., southw. to Conn., Md., Tenn., Kans., and Colo.; infrequent on the Coastal Plain.

58. RESEDACEAE (MIGNONETTE FAMILY)

1. Reseda (Tourn.) L.

1. **R.** LUTEA L.

A weed of lawns and flower beds; occasional. June–Sept.

C. U. campus, s. of Bailey Hall and lawn at Morse Hall.

Mass. to Pa., also in Mich. Adventive from Eu.

59. SARRACENIACEAE (PITCHER PLANT FAMILY)

1. Sarracenia (Tourn.) L.

1. **S. purpurea** L. PITCHER PLANT. SIDESADDLE FLOWER.

Acid peat bogs, also in marl bogs; frequent. June 10–30.

Larch Meadow, now nearly extinct (*D.*!); Freeville Bog (*D.*); Malloryville Bog (*D.*!); Woodwardia Bog (*D.*); McLean Bogs (*D.*); Conquest; moor of Junius marl ponds (*D.*!).

Lab. to the Canadian Rocky Mts., southw. to Fla., Ky., the Great Lakes, and Iowa; characteristically abundant on the Coastal Plain.

Possibly determined in bog habitat more by lack of nitrogen than by absence of lime.

60. DROSERACEAE (SUNDEW FAMILY)

1. Drosera L.

a. Leaves orbicular or broader than long; petioles hairy; rosette close; seeds fusiform, chaff-like, with a loose testa. 1. *D. rotundifolia*

a. Leaves spatulate; petioles glabrous; rosette loose; seeds oblong, reddish brown, with a close papillose testa. 2. *D. longifolia*

1. **D. rotundifolia** L. ROUND-LEAVED SUNDEW.

In moss and on rotten logs, in springy calcareous boggy places; frequent. July 15–30.

Marly meadow w. of Key Hill; marl slope at Larch Meadow; on logs, Dryden Lake; Freeville Bog (*D.*); Mud Creek, Freeville, on logs and hummocks; Malloryville (*D.*); Mud Pond, McLean Bogs (*D.*!); Beaver Brook springs; Westbury Bog; moor of Junius marl ponds.

Lab. to Alaska, southw. to Fla. and Calif., including the Atlantic Coastal Plain. Found also in Eurasia.

In the Cayuga Lake Basin this species apparently always occurs in calcareous places, never on the moor of acid bogs. This is strange, as in New Jersey and elsewhere along the coast it is common in the cedar swamps. The influencing factor may be that of available nitrogen.

2. **D. longifolia** L. (*D. intermedia*, var. *americana*, of Cayuga Fl.) SUNDEW.

Acid peat bogs, in sandy regions; rare. July 10–Aug.

Junius peat bogs (*Sartwell*, D.!), abundant some years.

Newf. along the coast to Fla. and La., locally in the Great Lakes region. A plant primarily of the sandy Coastal Plain. Found also in Eu. and the W. I.

61. CRASSULACEAE (ORPINE FAMILY)

a. Carpels united, the capsule 5-celled; petals usually wanting; plant not succulent. 1. PENTHORUM
a. Carpels separate; petals present; plant very succulent. 2. SEDUM

1. Penthorum (Gronov.) L.

1. **P. sedoides** L. DITCH STONECROP.

Low open grounds, usually in mucky soils; common. July–Aug.

N. B. to Minn., southw. to Fla., Kans., and Tex., including the Coastal Plain but less frequent there.

2. Sedum (Tourn.) L.

a. Leaves nearly terete, small, ovate; flowers yellow. 1. *S. acre*
a. Leaves flat and broad.
  b. Plant low and forking; flowers white, secund on the branches; leaves obovate, entire, the lower ones whorled. 2. *S. ternatum*
  b. Plant taller, not forking; flowers paniculate or corymbose, not secund; leaves toothed, all scattered.
    c. Flowers purple, perfect; stems 4–7 dm. high; leaves elliptic-ovate, conspicuously toothed; carpels loosely spreading. 3. *S. triphyllum*
    c. Flowers greenish yellow or purplish, dioecious; stems 1–2.5 dm. high; leaves oblanceolate-cuneate, obscurely toothed near the subacute apex; carpels subappressed, with divaricate tips. [*S. roseum*]

1. **S. ACRE** L. MOSSY STONECROP.

Dry gravelly or sandy roadsides and waste places, and on rocky banks; scarce. June 20–July.

Sparingly escaped from cultivation: near the "Nook" (*D.* in C. U. Herb.); Ithaca Falls (*D.*); roadside by Willow Glen Cemetery, Dryden; "Kidder's Ferry, rather abund. by the road" (*D.*); gravel pit, Butler village (*A. H. Wright* & others).

N. S. to Ont., southw. to Va. and N. Y. Adventive from Eurasia.

2. **S. TERNATUM** Michx.

Gravelly or rocky banks by streams, probably in slightly calcareous soils; scarce, but locally abundant. May 10–June 10.

Six Mile Creek, in the Narrows with Camptosorus (*J. T. Duncan*, 1870, according to Dr. Jordan, D.); "abundant in the ravine of the Ferris brook where it is probably introduced, as it is along the brook in the Cemetery" (*D.*); C. U. campus, brook by Barnes Hall; cemetery, University Ave., n. e. of the tool house.

Conn. to Mich., southw. to Ga., Tenn., and Ind.; less frequent on the Coastal Plain. Doubtfully indigenous in cent. N. Y. Even in Six Mile Creek it may have been washed down from some garden.

3. **S. TRIPHYLLUM** (Haw.) S. F. Gray. (See Rhodora 11:46. 1909. *S. purpurcum* of Gray's Man., ed. 7. *S. Telephium* of Cayuga Fl.) LIVE-FOREVER.

A weed on dry roadsides and banks, and in fields, in gravelly or sandy soils; frequent. Aug.–Sept.

White Church; road near South Hill Marsh; s. of Peruville; "thoroughly established along the rocky banks of the lake shore, south of L. Ridge and elsewhere; sometimes becoming a great pest in cultivated fields, east of Ithaca" (*D.*); and elsewhere.

Que. to Ont., southw. to Md. and Mich. Naturalized from Eurasia.

[**S. roseum** (L.) Scop. (Probably *S. telephioides* of Dudley and other writers on N. Y. botany.)

Not yet found in the Cayuga Lake Basin, but should occur here on limy cliffs. Reported from "Seneca Lake" in Sartwell's Catalogue (*D.*), by Prof. J. Hall in Torrey's *Flora of N. Y.*, 1:252, 1843, and by S. H. Wright in Rept. Cab. Nat. Hist. N. Y., 22:102, 1869; also reported from Chittenango Falls (see House, Rept. N. Y. State Bot., 1914, and Bul. N. Y. State Mus. 254, 1924, for history of that station), and collected there by the present authors. The plant was found at the entrance to Watkins Glen, where it is frequent, by L. F. Randolph in 1918. This may be the Seneca Lake station cited above. These are the only records available of the occurrence of this plant in N. Y. State.

Greenland and Lab., southw. along the coast to e. Maine, cent. N. Y., and the Delaware River, Pa. Found also in Eurasia.]

62. SAXIFRAGACEAE (SAXIFRAGE FAMILY)

a. Fruit capsular or follicular; herbs.
  b. Carpels 2; staminodia wanting.
    c. Petals present; ovary in part superior; bracts not leaf-like.
      d. Capsule 2-celled, 2-beaked; placentae axial; petals entire. 1. SAXIFRAGA
      d. Capsule 1-celled, often 2-beaked; placentae parietal or basal.
        e. Petals entire; capsule unequally valved. 2. TIARELLA
        e. Petals pinnatifid; capsule depressed, equally valved. 3. MITELLA
    c. Petals wanting; ovary wholly inferior; bracts round, leaf-like. 4. CHRYSOSPLENIUM
  b. Carpels 3–4; capsule 1-celled; staminodia present, glandular, alternating with the stamens. 5. PARNASSIA
a. Fruit a berry, 1-celled; shrubs with palmately lobed leaves; ovary wholly inferior. 6. RIBES

1. Saxifraga (Tourn.) L.

a. Plant scapose; leaves in a basal rosette, broad.
  b. Sepals reflexed; petals greenish or reddish, small; plant tall, 30–60 cm. high; leaves large, 10–30 cm. long, entire. 1. *S. pennsylvanica*
  b. Sepals not reflexed; petals white, larger, exceeding the calyx; plant low, 5–30 cm. high; leaves small, 2–7 cm. long, crenate. 2. *S. virginiensis*
a. Plant not scapose; leaves scattered, linear, entire or spinulose-serrate; petals yellow. 3. *S. aizoides*

1. **S. pennsylvanica** L. SWAMP SAXIFRAGE.

Low mucky meadow land or swampy woods, in acid and subacid soils, in gravelly or sandy regions; frequent. May 15–30.

Headwaters Swamp; West Branch Creek, Newfield; Larch Meadow (*D.*!); Indian Spring marsh (*D.*!); e. of Slaterville; Ellis Hollow; Ringwood; Mud Creek, Freeville; Malloryville Bog; and elsewhere.

Me. to Ont. and Minn., southw. to Va., Iowa, and Mo.; less frequent on the Coastal Plain.

2. **S. virginiensis** Michx. EARLY ROCK SAXIFRAGE.

On rocky banks and dry ledges in ravines, on noncalcareous sandstone, gravels, and clayey gravels; common. Apr.–May.

Rare in the McLean district and in the chestnut soils of the southern hills of the basin; common about the ravines and on the eastern slope of Cayuga Lake.

N. B. to Minn., southw. to Ga., Tenn., and Mo.; less frequent on the Coastal Plain.

3. **S. aizoides** L. YELLOW MOUNTAIN SAXIFRAGE.

Shaded dripping calcareous cliffs; very rare. June 15–30.

"Cliffs of Taughannock ravine, south side, below the falls; detected Oct. 1880" (*D.*). Elsewhere in N. Y. only at Fish Creek, Oneida Co. (*Knieskern & Vasey, House*), Salmon River, Oswego Co., 1893 (*W. W. Rowlee*!), Portage (*Day*), and in Warsaw Glen, 1871 (*Dr. Jordan, D.*).

Newf. and Lab. to B. C., southw. to Vt., N. Y., and Mich. Found also in arctic and alpine Eurasia.

This is one of three rare northern plants finding their southern limits on the shaded dripping rocks in the ravines of central New York. The other members of the group are *Primula mistassinica* and *Pinguicula vulgaris*.

2. Tiarella L.

1. **T. cordifolia** L. FALSE MITERWORT.

Dry or damp woodlands in humus, usually over gravelly or rocky, more or less calcareous, soils; common. May–June.

N. S. and N. B. to Minn., southw. in w. N. E. to Conn., to N. Y. and Ind., and in the mts. to Ga.; rare or absent on the Coastal Plain.

Two forms occur, one with salmon-pink, the other with light yellow, anthers. These are about equally common.

3. Mitella (Tourn.) L.

a. Stem bearing 2 opposite, nearly sessile, leaves; lobes of the leaves acute; flowers white; calyx cup-shaped. 1. *M. diphylla*

a. Stem naked, rarely with 1 or 2 leaves; leaves obtuse, scarcely lobed; flowers greenish; calyx saucer-shaped; petals with more filiform divisions. 2. *M. nuda*

1. **M. diphylla** L. MITERWORT. BISHOP'S CAP.

Ravines and damp thickets, in rich loamy or gravelly, more or less calcareous, soils with humus; common. May.

Absent on the acid sandy or gravelly soils and on the clays of the basin, otherwise general.

Que. to Minn., southw. to N. C., Mo., and Iowa; rare or absent in most of granitic N. E., and on the Coastal Plain.

2. **M. nuda** L.

Boggy woodlands in moss in calcareous regions; frequent. May 10–June 15.

W. of Key Hill; Michigan Hollow Swamp (*D.*!); swamp e. of Slaterville; Ellis Hollow Swamp (*D.*!); Bear Swamp (*D.*); Fir Tree Swamp, Freeville (*D.*); Mud Creek, Freeville (*D.*!); Malloryville Bog (*D.*); McLean Bogs (*D.*); Beaver Brook; arbor vitae swamp e. of Clyde; abundant in arbor vitae swamp w. of Turtle Pond.

Lab. to Alaska, southw. to Conn., Pa., Mich., Minn., and Mont.

4. Chrysosplenium (Tourn.) L.

1. **C. americanum** Schwein. GOLDEN SAXIFRAGE.

Wet mucky woodlands, usually in cold springs, apparently in both calcareous and noncalcareous waters; frequent. Apr.–May.

Near Key Hill; Larch Meadow; South Hill; Beech Woods, Six Mile Creek; s. e. of Dryden Lake; near Malloryville Bog; McLean Bogs; and elsewhere.

E. Que. to Minn., southw. to Ga. and Iowa; less frequent on the Coastal Plain.

5. Parnassia (Tourn.) L.

1. **P. caroliniana** Michx. GRASS OF PARNASSUS.

Dripping limy ledges in ravines, in marl springs, and on the moors of marl ponds; frequent. July 20–Sept.

Enfield Glen; Buttermilk Glen; Fall Creek, above and below Forest Home and by the hydraulic laboratory; moor of Mud Pond, McLean Bogs; Salmon Creek ravine; moor of Newton Ponds; Crusoe Prairie.

N. B. to Man., southw. to Va., Ill., and Iowa; generally absent on the Coastal Plain.

6. Ribes L.

a. Flowers in clusters of 1–4 (5); stems spiny at base of leaves and often on the internodes; hypanthium cup-shaped or short-tubular. (Gooseberries.)
  b. Hypanthium longer than the sepals; berries prickly; leaves almost velvety beneath, subcordate. 1. *R. Cynosbati*
  b. Hypanthium equaling or shorter than the sepals; berries not prickly; leaves sparingly pilose or glabrescent, rarely cordate.
    c. Petioles without branched trichomes; leaves sparingly pilose beneath; sepals narrowly oblong, twice the length of the hypanthium; stamens more or less exserted; a plant of dry places, often 2 m. high. 2. *R. rotundifolium*
    c. Petioles with branched trichomes; leaves less pubescent or glabrous; sepals broadly oblong, equaling the hypanthium; stamens not exserted; a plant of wet places, 1 m. high or less. 3. *R. hirtellum*
a. Flowers in racemes; stems spineless (except in *R. lacustre*); hypanthium saucer-shaped, cup-shaped, or tubular. (Currants.)
  b. Hypanthium long-cylindrical, two to three times the length of the spreading sepals; flowers fragrant, golden yellow. 4. *R. odoratum*
  b. Hypanthium saucer- or cup-shaped.
    c. Leaves resinous-dotted; hypanthium campanulate or short-oblong.
      d. Hypanthium 8–10 mm. long, glabrous, yellowish; bracts longer than the pedicels; twigs with a decurrent ridge from middle of leaf scar. 5. *R. americanum*
      d. *Hypanthium 3–6 mm. long, more open, pubescent, paler yellow*; bracts shorter than the pedicels; twigs without a decurrent ridge from middle of leaf scar. 6. *R. nigrum*
    c. Leaves not resinous-dotted.
      d. Ovary glandular-pubescent; hypanthium shallowly cup-shaped.
        e. Canes, at least the younger ones, densely bristly; larger leaves 4 cm. wide, deeply incised-lobed or -parted; fruit black. 7. *R. lacustre*
        e. Canes not bristly; larger leaves 5–7 cm. wide, with broad, doubly serrate lobes; fruit red. 8. *R. prostratum*
      d. Ovary glabrous; hypanthium saucer-shaped, almost flat.
        e. Plant upright; middle lobe of leaf ovate; pedicels glandless; flowers yellowish green. 9. *R. sativum*
        e. Plant weak, subprostrate; middle lobe of leaf broader, deltoid; pedicels glandular; flowers purplish green. 10. *R. triste*, var. *albinervium*

1. **R. Cynosbati** L. PRICKLY GOOSEBERRY.

Dry open thickets and scrubby fields or cliffs, in gravelly or stony neutral soils; common. May.

Apparently rare on the chestnut soils of the basin, common around the ravine and lake shore cliffs, and frequent in the McLean region.

W. Me. to Man., southw. to Conn., Pa., and Mo., and in the mts. to N. C.; rare or absent on the Coastal Plain.

The berries are occasionally smooth.

2. **R. rotundifolium** Michx.

Dry rocky or gravelly slopes, in acid or neutral sterile soils; scarce. May 12–25.

Road toward Buttermilk Glen (*D.* in C. U. Herb.); "South Hill near the 'Incline.' Near the 'Nook' green-house" (*D.*); Groton (*D.*); pasture w. of East Genoa near edge of Salmon Creek ravine.

W. Mass. and cent. N. Y. to N. C., along the mts.; practically absent on the Coastal Plain.

3. **R. hirtellum** Michx. (See Rhodora **13**: 47. 1911. *R. oxycanthoides* of Cayuga Fl.) SWAMP GOOSEBERRY.

Open boggy calcareous soils; frequent. May 12–June 10.

Michigan Hollow Swamp; Larch Meadow (D.!); near Negundo Woods (D.); Mud Creek, Freeville; Mud Pond, McLean Bogs; marshes of Dryden (*D.*); Miller Bog, Spring Lake; Westbury Bog; and elsewhere.

Lab. to Man. and N. Dak., southw. to Pa. and W. Va, including the Coastal Plain in the north. In coastal Mass. the plant grows around acid bogs.

4. **R.** ODORATUM Wend. (See Rhodora **11**: 47. 1909. *R. aureum* of Gray's Man., ed. 7.) MISSOURI OR BUFFALO CURRANT.

Occasionally escaped from cultivation to banks and thickets. May.

Cascadilla Glen, in woods about the Girls' Playground.

Native: Minn. to Mo., Ark., and Tex.

5. **R. americanum** Mill. (See Rhodora **11**: 46. 1909. *R. floridum* of Gray's Man., ed. 7, and of Cayuga Fl.) WILD BLACK CURRANT.

Moist banks, on low grounds along streams, and about swamps, mostly in alluvial soil; common, and generally distributed. May.

N. B. to Sask., southw. to Va., Ky., Iowa, and Nebr. Not clearly a calciphile, but very uncommon in sandy soil especially in the coastal regions.

6. **R.** NIGRUM L. CULTIVATED BLACK CURRANT.

Occasionally escaping from cultivation to hedgerows and moist thickets.

Springy run near road n. of Bald Hill, Caroline.

Native of Eu.

7. **R. lacustre** (Pers.) Poir. SWAMP BLACK CURRANT.

Deep boggy swamps, in calcareous regions; rare. June.

Michigan Hollow (*D.*); Ellis Hollow (*D.*); "Freeville Sw.," 1872 (*Jordan & Copeland,* D.); swamp near McLean Bogs (*D.*). Not seen in recent years, and no specimens from the above-named stations can be found.

Newf. to B. C., southw. to n. N. E., N. Y., Minn., Colo., and n. Calif., and in the mts. of Pa.

8. **R. prostratum** L'Her. (? *R. glandulosum* Grauer.) SKUNK OR FETID CURRANT.

Deep boggy swamps, in calcareous regions; frequent. May 10–30.

Ellis Hollow Swamp (*D.!*); swamp e. of Slaterville; Malloryville Bog woods; region of McLean Bogs; along Beaver Brook; and elsewhere.

Lab. to Alberta, southw. to n. N. E., Mich., and Minn., and along the mts. to N. C.

9. **R.** SATIVUM Syme. (See Bailey, Man. Cult. Pl., p. 335. 1924. *R. vulgare* of Gray's Man., ed. 7. *R. rubrum* of Cayuga Fl.) RED CURRANT.

Mostly in low open woods, but also in dry places; scarce. May.

South Hill (*D.*); Fall Creek woods near C. U. campus; near Indian Spring (*D.*); low woods, Mud Creek, Freeville; mossy thicket, border of McLean Bogs. In the dry-soil stations the plant appears to have escaped directly from cultivation; but in the boggy places it seems to constitute part of a general introduction into low ground throughout eastern N. A., and is apparently spontaneous.

Mass. to Wis., southw. to Va.; also in Oreg. and B. C. Native of Eu.

10. **R. triste** Pall., var. **albinervium** (Michx.) Fernald. (*R. rubrum*, var. *subglandulosum*, of Cayuga Fl.) WILD RED CURRANT.

Deep boggy woods, probably in calcareous regions only; frequent. May 10–30.

N. of Cayuta Lake (*D.*); Michigan Hollow Swamp (*D.*!); s. of Caroline Depot; Ellis Hollow Swamp (*D.*!); Dryden-Lansing Swamp (*Dr. Jordan*, *D.*); Ringwood; Freeville; Mud Creek, Freeville; near Mud Pond, McLean Bogs; Beaver Brook (*D.*!); w. of East Genoa; and elsewhere.

Newf. to Alaska, southw. to N. S., N. H., N. Y., Mich., and Wis.

63. HAMAMELIDACEAE (WITCH-HAZEL FAMILY)

1. Hamamelis L.

1. **H. virginiana** L. WITCH-HAZEL.

Dry woods and ravine banks, in gravelly, nearly neutral, soils; common. Oct.–Nov. Fruit ripening the next season.

Generally distributed throughout the basin, except in the more calcareous soils and the heavy clays.

N. S. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

Apparently two forms occur: one with sulphur-yellow, the other with deep yellow, flowers, the latter flowering much the later, chiefly in November.

64. PLATANACEAE (PLANE TREE FAMILY)

1. Platanus (Tourn.) L.

1. **P. occidentalis** L. SYCAMORE. BUTTONWOOD.

Bottom lands, in alluvial and lacustrine, gravelly and sandy, subacid and alkaline, but not in boggy, soils; frequent. June.

Along most of the larger streams of the basin. The first-growth trees were often of large size, and were perhaps the largest trees of this region.

S. Me., n. Vt., and Ont., to Minn., southw. to Fla., Tex., and Kans., including the Coastal Plain.

65. ROSACEAE (ROSE FAMILY)

ARTIFICIAL KEY TO THE GENERA

a. Ovary inferior; carpels 2–5, each 1–5-seeded, fused in the axis of the receptacle; fruit fleshy; plants woody.

b. Mature carpels papery or leathery, 2-ovuled; leaves usually not incised.

c. *Cells of the ovary as many as the styles; flowers in umbels or corymbs, white or pink.*

d. Inflorescence umbellate-racemose; flowers large (more than 2 cm. in diam., rarely less in exotics); fruit usually large (20 mm. in diam. or more); leaves simple.

e. Styles free to the ovary; hypanthium (or disk) generally constricted above the ovary; flesh of the fruit usually containing grit cells. 6. PYRUS

e. Styles more or less united; hypanthium generally open; flesh of the fruit without grit cells. 7. MALUS

d. Inflorescence plainly corymbose-paniculate; flowers small, 1.5 cm. in diam. or less (in exotics sometimes 2 cm.); fruit small, 5–15 mm. in diam. (rarely up to 30 mm. in exotics); leaves simple or compound.

e. Leaves pinnate; styles free. 8. SORBUS

e. Leaves simple; styles usually united below. 9. ARONIA

c. Cells of the ovary, at least in fruit, twice as many as the styles, through intrusion of the wall; flowers in racemes, white. 10. AMELANCHIER

b. Mature carpels very hard and bony, usually 1-ovuled; leaves usually incised; plant usually thorny; flowers white. 11. CRATAEGUS

a. Ovary superior; carpels 1–many.

b. Carpels 2–several, distinct; herbs or shrubs with simple or compound leaves.

c. Fruit follicular or indehiscent; carpels 2–many-ovuled (in no. 4 1-seeded in fruit).

d. Carpels bladdery-inflated in fruit; shrubs with broad, lobed, simple leaves, and numerous small flowers; bark shreddy. 1. PHYSOCARPUS

d. Carpels not inflated.

e. Flowers very small and numerous; petals oval.

f. Leaves simple; shrubs. 2. SPIRAEA

f. Leaves pinnate.

g. Leaflets all lanceolate, finely serrate, straight-veined; stipules narrow; plants suffrutescent. 3. SORBARIA

g. Leaflets generally broader, the terminal ones larger, all irregularly incised or lobed; stipules broad; plants herbaceous. 4. FILIPENDULA

e. Flowers few, large; petals strap-shaped; leaves 3-foliolate; herbs. 5. GILLENIA

c. Fruit an achene or a drupe; carpels 1-ovuled.

d. Fruits not inclosed permanently in the receptacle; leaves simple or compound.

e. Ovaries ripening as achenes; bractlets present between the sepals; plants herbaceous, with compound leaves.

f. Styles not elongated in fruit.

g. Receptacle much enlarged in fruit, pulpy, red or white; leaves 3-foliolate.

h. Flowers white; bractlets subentire; fruit usually acid and of good flavor; leaflets sharply serrate; plant scapose, with flowerless and almost leafless runners. 12. FRAGARIA

h. Flowers yellow; bractlets broad, 3-lobed; fruit nearly tasteless; leaflets crenate; plant indistinctly scapose, the leafy runners flower-bearing. 13. DUCHESNEA

g. Receptacle not enlarged, dry.

h. Achenes 2–6 (10); plants scapose; leaves 3-foliolate; flowers yellow. 14. WALDSTEINIA

h. Achenes many; plants caulescent; leaves palmately 3–7-foliolate, or pinnate; flowers white, cream, yellow, or purple. 15. POTENTILLA

f. Styles elongated in fruit, hooked, persistent, often plumose; flowers white, purple, or yellow. 16. GEUM

e. Ovaries ripening as drupelets; bractlets between the sepals absent.

f. Drupelets many, on an enlarged convex receptacle; plants herbaceous or woody, often prickly, prostrate or erect, often tall; leaves simple or compound; flowers purple or white. 17. RUBUS

f. Drupelets few, at the bottom of the concave receptacle, nearly dry; plants very low, herbaceous, creeping; leaves simple; flowers white. 18. DALIBARDA

d. Fruits permanently inclosed in the receptacle; leaves pinnate.
e. Receptacle dry and woody; plants herbaceous, not prickly.
f. Receptacle top-shaped, ribbed, with hooked spines at the throat; flowers yellow. 19. AGRIMONIA
f. Receptacle 4-angled, naked; flowers white or green. 20. SANGUISORBA
e. Receptacle fleshy; plants woody, often prickly; flowers pink or white. 21. ROSA
b. Carpel 1; fruit a drupe; trees or shrubs with simple leaves. 22. PRUNUS

1. **Physocarpus** Maxim.

1. **P. opulifolius** (L.) Maxim. (*Neillia opulifolia* of Cayuga Fl.) NINEBARK.

Dry rocky ledges and talus of ravines and lake cliffs, in calcareous regions; common. June 10–30.

Rare in the ravines of the basin from Fall Creek southw., probably due to the less limy nature of the rocks of that region.

Que. to Ill., southw. to Fla. and Tenn.; rare in the noncalcareous parts of N. E. and on the Coastal Plain.

Physocarpus is in the list of *nomina conservanda* of the International Code.

2. **Spiraea** (Tourn.) L.

a. Leaves glabrous or sparingly pubescent beneath.
b. Inflorescence tomentulose; leaves oblanceolate, finely serrate; twigs yellowish brown. 1. *S. alba*
b. Inflorescence subglabrous or slightly villous; leaves elliptical, more coarsely serrate; twigs reddish brown. 2. *S. latifolia*
a. Leaves densely white- or tawny-tomentose beneath. 3. *S. tomentosa*

1. **S. alba** DuRoi. (*S. salicifolia* of Gray's Man., ed. 7, and of Cayuga Fl.) MEADOW-SWEET.

Open marshlands, mostly in somewhat limy soils; frequent. Aug.–Sept.

Cayuta Lake; Spencer Lake; Inlet and Cayuga Marshes; Canoga Marshes; Freeville; Mud Pond, McLean Bogs; Chicago Bog; and elsewhere.

Ont. and N. Y. to Sask., southw. to N. C., Ind., and Mo.; rare or absent on the Coastal Plain.

This plant is very closely related to *S. salicifolia* L. of Siberia and Japan, and by many authors has been considered identical with it. It apparently differs from *S. salicifolia* in the smaller, more generally white, flowers, and the more acute, more sharply toothed, leaves. The width of the panicle, cited by some authors as a difference, is of little value as a diagnostic character. The flowers of the Siberian species are nearly twice as large as those of *S. alba* and are generally purple.

2. **S. latifolia** (Ait.) Borkh. MEADOW-SWEET.

In situations similar to the preceding, but in more acid soils; rare. July 15–Aug. Chicago Bog.

Newf. to Sask., southw. to Va. and w. Pa.; the common meadow-sweet of N. E. and the Coastal Plain.

A large clump with pink flowers was found near an abandoned road at Grotto. It may have been planted there.

3. **S. tomentosa** L. HARDHACK. STEEPLE BUSH.

Low exsiccated sandy pasture land; rare. July–Aug.

N. w. corner of Dryden Township, 1918 (*A. Gershoy*!), confined to one field, where it is abundant; doubtfully native.

N. B. and N. S. to Minn., southw. to the mts. of Ga. and to Kans.; common in N. E. and on the Coastal Plain. A plant primarily of light, somewhat acid, soils.

3. Sorbaria A. Br.

1. **S.** SORBIFOLIA (L.) A. Br.

Roadsides, thickets, and waste places, in gravelly soils; rare.

Thicket, mouth of Enfield Glen near Newfield road, 1922 (*W. C. Muenscher*); s. side Six Mile Creek, near reservoir, 1923 (collector unknown); roadside s. of McLean station.

Escaped from cultivation. Native of Asia.

Sorbaria is in the list of *nomina conservanda* of the International Code.

4. Filipendula (Tourn.) Mill.

a. Leaflets large, the terminal ones much the largest and palmately lobed.
  b. Leaves green both sides, the lateral leaflets lobed. 1. *F. rubra*
  b. Leaves white-tomentose beneath, the lateral leaflets not lobed. 2. *F. Ulmaria*
a. Leaflets small, about 3 cm. long, all similar, and pinnatisect. [*F. hexapetala*]

1. **F.** RUBRA (Hill) Robinson. (*Spiraea lobata* of Cayuga Fl.) QUEEN OF THE PRAIRIE.

Roadsides and yards, in rich soil; occasional. July.

Five miles s. w. of Newfield (*W. C. Muenscher*); "a bed of this plant has been growing vigorously for some years on the marsh north of Ithaca [near Jarvis' boat-house]" (*D.*); roadside n. w. of West Dryden.

Native from Pa. to Mich., southw. to Ga., Ky., and Iowa; locally established northeastw.

2. **F.** ULMARIA (L.) Maxim. *QUEEN OF THE MEADOW.*

Roadsides and vacant lots; occasional. July.

Escaped from cultivation: roadsides n. of Danby (*A. J. E. & L. H. MacDaniels*); roadside, one mile above Enfield Falls (*W. C. Muenscher*); Connecticut Hill; ravine n. of Buttermilk Glen; near Hudson St., South Hill; roadside n. of West Dryden; roadside near Duck Lake (*L. Griscom & A. H. Wright*).

Native of Eurasia.

[**F.** HEXAPETALA Gilib. MEADOW-SWEET. DROPWORT.

Escaped from cultivation n. of Forest Home, 1909 (*Wm. Moore*), but probably not established.

Native of Eurasia.]

5. Gillenia Moench

1. **G. trifoliata** (L.) Moench. BOWMAN'S ROOT. FALSE IPECAC. INDIAN PHYSIC.

Dry open woods, usually with oak, in gravelly or stony, slightly acid, soils usually mixed with clay; frequent. June.

Cayuta Lake; near South Hill Marsh; Coy Glen; Cascadilla woods; Beebe Lake; Renwick slope; Ludlowville; and elsewhere. Not recorded from the lighter sandy soils or from the more residual soils of the higher hills.

Ont., N. Y., and N. J., to Mich., southw. to Ga. and Mo.; rare or absent on the Coastal Plain.

6. Pyrus (Tourn.) L.[19]

1. **P.** *COMMUNIS* L. *COMMON PEAR.*

Rich banks; occasionally self-seeding. May 1–20.

Escaped from cultivation, and scattered throughout the basin.

Native of Eu.

[19] Following Schneider, Rehder in part, and some European authors, the old genus Pyrus is here divided into four genera: Pyrus, Malus, Aronia, and Sorbus. Pyrus and Malus are distinct in style character, and fairly distinct as to hypanthium and stone-cells of the flesh, and they do not hybridize. The corymbose inflorescence and the size of flowers render Aronia and Sorbus distinct from Pyrus and Malus. Aronia and Sorbus are very similar structurally, but custom and the general difference in appearance of the plants make a separation of the two as distinct genera desirable.

7. **Malus** Mill.

a. Leaves almost regularly serrate or crenate, rugose, usually tomentose; pedicels stout at flowering time, 1.4–2 mm. in diam., subumbellate; sepals 3–4.5 mm. wide at base, generally revolute; petals white, pink, or purple, the claws one-half or less than one-half the length of the sepals; disk about 3–4 mm. in diam., saucer-shaped; anthers white; fruit 2.5 cm. in diam. or more. 1. *M. pumila*

a. Leaves incised-serrate or lobed, less rugose or smooth, usually glabrous; pedicels slender at flowering time, 0.7–1 mm. in diam., in short racemes; sepals about 2 mm. wide at base, not revolute; petals delicate pink, the claws one-half or more than one-half the length of the sepals; disk about 2–2.5 mm. in diam., more cup-shaped; anthers salmon color; fruit less than 2.5 cm. in diam., usually very waxy.

  b. Leaves ovate or elliptic-oblong, obtuse or barely acute, the teeth rather blunt. 2. *M. coronaria*

  b. Leaves ovate or narrowly triangular-ovate, very acute, sharply toothed. 2a. *M. c.*, var. *elongata*

1. **M.** PUMILA Mill. (*Pyrus Malus* of many recent authors.) COMMON APPLE.

Rich banks and old pastures; frequently self-seeding. May 1–25.

Escaped from cultivation and generally distributed.

Native of Eurasia.

Since the combination *Malus Malus* is not admissible, and *M. sylvestris* Mill. is another species, *M. pumila* becomes the oldest valid name applied to the whole or a part of the present species.

2. **M. coronaria** (L.) Mill. (See Rehder in Sargent's *Trees and Shrubs*, **2**: 139, 228. 1913. Mitth. Deut. Dend. Gesell. **1914**:259. *Pirus coronaria* of Cayuga Fl., in part. *Pyrus coronaria* of many authors. *M. fragrans* Rehder.) WILD CRAB-APPLE.

Moist or dry thickets, in more or less calcareous gravelly loams; frequent. May 15–June 10.

Hillside s. e. of White Church; mouth of Lick Brook ravine; hillside Enfield to Ithaca, several places; Cascadilla Creek; Besemer; Etna; shore of Lowery Ponds; and elsewhere.

N. Y. and N. J. to Wis., southw. to Del. and Mo., and in the mts. to N. C.; very infrequent on the Coastal Plain.

Rehder has noted that the above Linnean name applies doubtfully to this species.

2a. **M. coronaria** (L.) Mill., var. **elongata** Rehd.

In situations similar to the preceding, and often growing with the typical form; frequent.

Hillside, Enfield to Ithaca; near mouth of Lick Brook ravine; South Hill; Six Mile Creek; Cayuga Heights; Etna; Crowbar Point; and elsewhere.

N. Y. to Ohio, southw. in the mts to Ga.

The var. *glaucescens* Rehder has not been found in the Cayuga Lake Basin. *M. glabrata* Rehder is planted near the Home Economics Building and elsewhere about Ithaca.

8. **Sorbus** (Tourn.) L.

a. Leaflets lanceolate, acuminate, glabrous; winter buds glabrous; flowers small, 5–6 mm. in diam.; fruit small, 6–7 mm. in diam. 1. *S. americana*

a. Leaflets elliptic-oblong, rather blunt; flowers large, 8–10 mm. in diam.; fruit 9 mm. in diam.

  b. Leaflets bright green, glabrous; buds glabrous; cymes subglabrous. 2. *S. dumosa*

  b. Leaflets dull green, more or less pubescent, smaller than in the preceding; buds hairy; cymes tomentose. 3. *S. Aucuparia*

1. **S. americana** Marsh. (*Pirus americana* of Cayuga Fl. *Pyrus americana* of Gray's Man., ed. 7.) AMERICAN MOUNTAIN ASH.

Boggy and springy places, apparently only in limy soils; rare. June.

Michigan Hollow Swamp (*D.*); around Woodwardia Bog (*D.*); Malloryville Bog (*D.*); McLean Bogs (*D.*!); Beaver Brook.

Lab. to Man., southw. to n. and w. N. E., N. Y., and Mich., and in the mts. to N. C.

2. **S.** DUMOSA Greene. (See Rhodora **23**: 266. 1921. *Pyrus sitchensis* of Gray's Man., ed. 7. *Pirus sambucifolia* of Cayuga Fl., at least in part.)

Roadsides and the borders of woods, in gravelly or stony light neutral soils; rare. May 25–June 20.

Doubtfully native: swamp in Enfield (*J. P. Young*); by road and woods n. of Caroline Center, frequent; by road near Freeville, 1882 (*D.* in C. U. Herb.).

Native: Lab. to Alaska (?), southw. to cent. Me., Pa., Mich., and Colo.

3. **S.** AUCUPARIA L. (*Pirus sambucifolia* of Cayuga Fl., at least in part.) EUROPEAN MOUNTAIN ASH. ROWAN TREE.

Occasionally escaping from cultivation to roadsides and thickets, as w. of Michigan Hollow Swamp and at Kidders.

Native of Eu.

9. Aronia Medic.

a. Leaves and corymbs tomentose; fruit purple. 1. *A. arbutifolia*, var. *atropurpurea*

a. Leaves and corymbs glabrous; fruit practically black. 2. *A. melanocarpa*

1. **A. arbutifolia** (L.) Ell., var. **atropurpurea** (Britton) Schneider. (*Pirus arbutifolia*, var. *erythrocarpa*, of Cayuga Fl. *Pyrus arbutifolia*, var. *atropurpurea*, of Gray's Man., ed. 7.) RED CHOKEBERRY.

Bogs; scarce. June. The flowers and fruit mature later than in *A. melanocarpa*.

Headwaters Swamp; s. slope of Connecticut Hill; Michigan Hollow Swamp; South Hill Marsh (*D.*!); Slaterville Swamp; Junius ponds. Dudley cites a station, "South Hill, near the R. R., on the rocky bank of the South Quarry Cr.," but this would be a very unusual habitat.

Newf. to Ont. and Mich., southw. possibly to Fla.; common on the Coastal Plain.

2. **A. melanocarpa** (Michx.) Britton. (*Pirus arbutifolia*, var. *melanocarpa*, of Cayuga Fl. *Pyrus melanocarpa* of Gray's Man., ed. 7.) BLACK CHOKEBERRY.

Acid peat bogs and in marly bogs; common. May 20–June 15.

Enfield (*D.*); Danby (*D.*); Larch Meadow (*D.*); South Hill Marsh; Slaterville Swamp; McLean Bogs (*D.*!); Freeville; Junius peat bogs, and also marly moor of Lowery Ponds; Spring Lake; and elsewhere. Stations in limy soils are infrequent.

N. S. to Mich., southw. to Fla.; common on the Coastal Plain.

10. Amelanchier Medic.[20]

a. Leaves coarsely toothed, not acuminate; hypanthium prominent and cup-shaped on the young fruit; sepals revolute; summit of ovary woolly; shrubs.

b. Leaves oval, with straight veins and prominent teeth; petals 11–22 mm. long; plant 1–3 m. high.

c. Petals 11–15 mm. long; lower pedicels 7–20 mm. long; calyx 3.5–6 mm. in diam. to curve of sepals, the sepals 2–3 mm. long; anthers 0.6–0.8 mm. long; leaves green, usually with some persistent wool beneath; plant somewhat stoloniferous, usually in large clump-like colonies. 1. *A. sanguinea*

[20] For recent changes in nomenclature and treatment, see Rhodora 14 : 117 (1912), also 22 : 146 (1920), and 23 : 48 (1921).
The species of this genus are commonly called Shadbush, June Berry, or Service-berry.

c. Petals 16–22 mm. long; lower pedicels 27–40 mm. long; calyx 7–9 mm. in diam. to curve of sepals, the sepals 3–5 mm. long; anthers 1–1.2 mm. long; leaves more glaucous and more quickly glabrate; plant scarcely stoloniferous; stems solitary or few. 2. ***A. amabilis***

b. Leaves oblong, with more irregular veins and less prominent teeth; calyx 4–5 mm. in diam. to curve of sepals, the sepals 2–3 mm. long; petals 7–10 mm. long; plant 1.5 m. high or less, stoloniferous. 3. ***A. humilis***

a. Leaves finely toothed, generally blunt; hypanthium prominent or often inconspicuous on the young fruit; sepals revolute; summit of ovary woolly; low stoloniferous shrubs 1.5 m. high or less (see also 3d *a*). 4. ***A. stolonifera***

a. Leaves finely toothed, often acuminate; hypanthium inconspicuous on the fruit; sepals revolute or more commonly reflexed; summit of ovary glabrous, or with a few hairs in no. 5.

b. Leaves oblong or oblong-obovate, acute, hairy when young, often with a tinge of red; petals 6–8 mm. long; tall shrubs with an alder-like habit, growing in clumps; sepals ascending, spreading, or irregularly revolute. 5. ***A. intermedia***

b. Leaves ovate or obovate, short-acuminate; petals 10–18 mm. long; small trees when mature, not in clumps.

c. Foliage and inflorescence tomentose when young; petioles and often the blade hairy at maturity; hypanthium 2.5–3 (3.5) mm. in diam.; sepals broad, strongly reflexed. 6. ***A. canadensis***

c. Foliage and inflorescence glabrous from the first, the foliage, when young, bronze-red or rarely bright green; hypanthium larger, (3) 3.5–5 mm. in diam.; sepals narrower, reflexed. 7. ***A. laevis***

1. **A. sanguinea** (Pursh) DC. (*A. spicata* of Gray's Man., ed. 7. *A. canadensis,* var. *rotundifolia,* in part, of Cayuga Fl.)

In dry open fields and on ledges, in sterile noncalcareous soils; frequent. May 15–25.

Characteristic of the chestnut soils and sandstone ledges of the hills s. w., s., and s. e. of Ithaca, and found more sparingly on the cliff crests along the lake shore from Esty to Willets: hilltop, North Spencer; hill crests and rocks, Thatcher Pinnacles (*D.*!) and White Church (*D.*!); Connecticut Hill; Enfield Glen; Turkey Hill; toward McKinneys and Esty Glen; lake cliffs, Ledyard; Elm Beach, Romulus; dry woods, Vandemark Pond.

Me. to Wis., southw. in the mts. to Ala.

2. **A. amabilis** Wiegand. (*A. canadensis,* var. *rotundifolia,* in part, of Cayuga Fl. *A. sanguinea,* forma *grandiflora* Wiegand. *A. grandiflora* Wiegand not Rehder.)

Dry cliffs in the ravines and along the lake shore, on more calcareous rocks than the preceding; frequent. May 15–25.

Enfield Glen; Fall Creek Gorge; Taughannock Gorge; lake shore slopes near Esty Glen and McKinneys; Portland Point; Genoa; Ledyard; Romulus; and elsewhere.

Cent. and w. N. Y. to Ont. A plant of limy regions.

3. **A. humilis** Wiegand.

Dry calcareous ledges and talus; rare. May 15–20.

Along the railroad just n. of McKinney Twin Glens (type station); cliffs of Cayuga Lake at Willets, and just s.

Vt. to Minn. and Mackenzie, southw. to e. and cent. N. Y., Ohio, and Nebr.

Hybrids of this species with *A. sanguinea* are frequent.

4. **A. stolonifera** Wiegand.

Dry sandy or gravelly noncalcareous soils; rare. May 15–25.

Roadside and barren field s. w. of Pout Pond, 1919 (*K. M. W., A. J. E., & L. F. Randolph*); roadside and fence rows s. of Waterloo, 1924.

Newf. to Va. along the coast, and up the rivers in N. E.; also around the Great Lakes from the city of Quebec to Michigan.

In its dwarf substoloniferous habit this species resembles *A. humilis*, but the leaf margin is distinctive.

5. **A. intermedia** Spach. (*A. canadensis*, form, no. 298 of Cayuga Fl.)

Thickets, in boggy calcareous or noncalcareous soils; scarce. May 10–20.

Michigan Hollow Swamp; South Hill Marsh; Freeville Bog; Mud Pond, McLean Bogs; Lake Como; Lowery Ponds; Junius peat bogs; Miller Bog, Spring Lake; Featherbed Bog. The stations are all more or less calcareons except the South Hill and Junius peat bog stations.

Vt. to w. Pa., southw. to N. C.; not reported from the Coastal Plain.

6. **A. canadensis** (L.) Medic. (*A. c.*, var. *Botryapium*, of Gray's Man., ed. 7. *A. c.*, var. *oblongifolia*, of Cayuga Fl.) SHADBUSH.

Dry exposed hedgerows, ravine crests, and slopes, in gravelly or sandy neutral soils; common. May 1–15.

Less abundant on the chestnut soils w., s., and s. e. of Ithaca.

N. S. and e. Me., and from w. N. E. to Wis., southw. to Ga., La., and Mo.; rare in e. N. E. and on the Coastal Plain. Not a plant of acid sands and granitic soils.

7. **A. laevis** Wiegand. (*A. canadensis* of Gray's Man., ed. 7, and of Cayuga Fl.) SHADBUSH. JUNE BERRY. SERVICE-BERRY.

Damp or rather dry woodlands and thickets, usually in more acid soils than the last preceding species; common. May [illegible]–15.

Especially common on the hills of Newfield, [illegible] Danby, Spencer, and Caroline, and around the peat bogs; in the ravines, usually confined [illegible] to the south slopes.

Newf. throughout N. E. to Mich., southw. to Ga., A[illegible], and Kans.; rare on the southern Coastal Plain, probably because of the climate. A [illegible] plant of more northern distribution and of more acid soils than *A. canadensis*. [illegible]

Hybrids of this and of *A. canadensis* are frequent. [illegible]

The fruit of all local species of Amelanchier except *A. canadensis* [illegible] is dark, juicy, and edible; that of *A. canadensis* is red, dry, and mealy, and falls early [illegible]

11. Crataegus L.[21]

a. Leaves deeply pinnately lobed, the lobes few-toothed; spines 0.5–3 cm. long [illegible] sepals short, broad, and blunt; style and nutlet 1; fruit 4–7 mm. in diam.

1. *C. monogyn*[illegible]

a. Leaves serrate, often also incised or shallowly lobed; spines if present usu[illegible]ally [illegible] longer than in no. 1; sepals acute; styles and nutlets 2–5, rarely 1 in no. 2; fru[illegible]t usually larger than in no. 1.

b. Leaves conspicuously cuneate, in outline oblanceolate, obovate, or oval; veins ascending; winter buds not glutinous, or slightly so in no. 5; styles and nutlets (1) 2–3 (4).

c. Stamens 7–10[22]; leaves glabrous, or hairy only on the veins, or strigose above.

d. Petioles slender, when young 0.7–0.9 mm. in diam., when old 0.7–1.6 mm. in diam.; veins not prominent, often irregular, little impressed; (fruits 7–15 mm. in diam.).

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[21] The forms here listed are those which seem to be unquestionably good species, together with several others which, though having the appearance of hybrid origin, cannot readily be so interpreted. Many other forms also occur, but these are mostly of more erratic distribution and can usually be interpreted as crosses between species present in the same locality. Such hybrid individuals are not given special mention in the text. Much remains to be done before the species in the Cayuga Lake Basin are fully understood and their nomenclature is satisfactorily worked out. The present treatment, therefore, must be considered provisional. Much information about soils and distribution has been contributed by William Moore.

[22] Seen on the fruit as well as in the flower.

e. Leaves simply serrate, thick, glossy, short-petioled, narrowly obovate or elliptic-oblanceolate; anthers pink; (thorns often long and recurved). 2. *C. Crus-galli*

e. Leaves incised-serrate or doubly serrate or shallowly lobed, not very thick nor conspicuously glossy, short- or long-petioled, oval or obovate.

f. Leaves with thick, rather blunt teeth; anthers white or cream-colored; flesh of fruit firm.

g. Sepals linear-lanceolate, entire or nearly so; flowers about 14 mm. in diam. 4. *C. Margaretta*

g. Sepals broader, glandular-serrate or pinnatifid; flowers about 20 mm. in diam. 11. C. *straminea*

f. Leaves with sharp slender teeth; anthers cream-colored or pink; sepals usually serrate; flesh of fruit more succulent. 5. *C. Brainerdi*

d. *Petioles stout, when young (0.9) 1.1–1.3 mm. in diam., when old 0.9–2 mm.* in diam.; leaves thick; veins prominent, parallel, usually impressed; sepals serrate. 6. *C. macracantha*

c. Stamens 17–22; leaves glabrous or hairy.

d. Leaves elliptic or oblanceolate, subappressed-villous on the veins beneath, strongly impressed-veined; twigs gray; styles and nutlets 3 (4); flesh of fruit firm. 3. *C. punctata*

d. Leaves broader; twigs reddish or brownish; styles and nutlets 2–3; flesh of fruit usually succulent.

e. Leaves strigose above or glabrous, not strongly veined; petioles rather slender, when young 0.5–0.9 mm. in diam., when old 0.8–1.5 mm. in diam.; fresh, unopened anthers 1.8–2 mm. long; styles and nutlets generally 3; fruit 9–15 mm. in diam. 5. *C. Brainerdi*

e. Leaves stiff-velvety beneath, strongly veined; petioles stouter, when young 0.9–1.2 mm. in diam., when old 1–1.8 mm. in diam.; fresh, unopened anthers 0.7–1.3 mm. long; styles and nutlets generally 2; fruit 7–10 mm. in diam.

f. Twigs glabrous, reddish, polished; leaves glabrous above, thick when old; sepals broad, strongly serrate; fresh, unopened anthers 0.7–1 mm. long; fruit globose; pedicels 5–33 mm. long. 7. *C. succulenta*

f. Twigs hairy, brownish, rather dull; leaves hairy above, rarely glabrate, thinner, duller, and more lobed; sepals narrow, slightly serrate; fresh, unopened anthers 1.2–1.3 mm. long; fruit oval, some with short pedicels (as short as 3 mm. or even 1 mm.). 8. *C. Calpodendron*

b. *Leaves subcordate, truncate, rounded, or rarely subcuneate at base, in outline* ovate or oval, incised or lobed; veins rather distant and not conspicuously parallel, irregular, often widely spreading; styles and nutlets (3) 4–5; petioles slender; winter buds glutinous or nonglutinous.

c. Stamens about 20; leaves more or less waxy to the touch, glabrous or glabrate; corymbs glabrous; filaments usually somewhat connate at base; (sepals subconnate at base, subentire, triangular; young foliage bronzy green; winter buds nonglutinous; fruit generally glaucous, with a prominent hypanthium and firm or only slightly succulent flesh).

d. Pedicels short and stiff, not drooping; corymbs few-flowered; leaves deltoid-ovate, entirely glabrous; teeth only moderately sharp; flowers 18–20 (25) mm. in diam.; disk 4 (5) mm. wide; anthers pale pink; fruit tardily greenish cherry red, 11–15 mm. in diam., very glaucous. 12. *C. pruinosa*

d. Pedicels slender, more or less drooping; corymbs many-flowered; flowers 20–25 mm. in diam.; fruit soon deep red.

e. Leaves round-ovate, often subcrenate, rather blunt, entirely glabrous; teeth thick and bluntish; disk 6 mm. wide; anthers pale pink; fruit *strongly drooping, cherry red, very glaucous, generally 15–19 mm. in* diam. 13. *C.* sp.

e. Leaves deltoid-ovate, more acute; teeth and lobes sharper than in nos. 12 and 13, the upper surface usually slightly strigose; disk 5–5.5 mm. wide; *anthers dark purple; fruit less drooping, scarlet-crimson*, scarcely glaucous, generally 12–16 mm. in diam. 14. *C. beata*

c. Stamens 5–12; leaves of ordinary texture or waxy, glabrous or hairy; filaments usually entirely free; (sepals usually free except in no. 15; fruit generally not glaucous).

d. Flowers subumbellately corymbose, usually few; bracts usually conspicuous; leaves firm, usually waxy, yellowish green when young, the teeth thick; *petioles rather stout and short, 7–18 (27) mm. long, more or less margined*; winter buds nonglutinous; sepals generally serrate or pectinate; fruit on short stiff pedicels, dull orange-red; flesh firm; hypanthium prominent.

e. Leaves on the shoots ovate, subtruncate at base.

f. Foliage, corymbs, and ovaries rough-hairy and glandular. 9. *C. intricata*

f. Foliage, corymbs, and ovaries glabrous. 10. *C. Boyntoni*

e. Leaves on the shoots oval, more or less cuneate at base, glabrous; (corymbs more branched than in nos. 9 and 10). 11. *C. straminea*

d. Flowers distinctly corymbose, often numerous; bracts usually inconspicuous; young foliage generally bronzy green (yellowish green in no. 19); petioles slender, 8–40 mm. long, rarely margined at all; winter buds glutinous, especially when unfolding; sepals subentire or serrate; fruit on stiff or drooping pedicels, mostly crimson or scarlet; flesh usually succulent; hypanthium not prominent (except sometimes in no. 16).

e. Leaves of waxy texture, substrigose above or glabrous; teeth thin or thick; corymbs glabrous. 15. *C. filipes*

e. Leaves of ordinary texture, strigose or slightly rough above; teeth thin.

f. Sepals narrow, taper-pointed, entire, reflexed; fresh, unopened anthers purple, 1.5–1.7 mm. long; corymbs usually glabrous; fruit 12–14 mm. in diam., generally oval; filaments usually persisting fresh; leaves rather small, the larger ones mostly 20–40 mm. wide, or at maturity up to 50 (60) mm. wide. 16. *C. macrosperma*

f. *Sepals generally broader, serrate, spreading or ascending*; fresh, unopened anthers pink or white, 1.9–2.5 mm. long; corymbs glabrous or villous; fruit 14–19 mm. in diam.; filaments generally withering; leaves large, elliptic-ovate to broadly ovate, the larger ones mostly (30) 40–70 (90) mm. wide.

g. Leaves elliptic-ovate and subacuminate except on leading shoots; corymbs usually glabrous; anthers pink; fruit pyriform. 17. *C. Holmesiana*

g. Leaves broad, full and rounded; fruit pyriform or subglobose.

h. Leaves glabrous or nearly so beneath; petioles glabrous; anthers pink; corymbs hairy or glabrous. 18. *C. coccinea*

h. Leaves and petioles villous or subtomentose; anthers cream color; corymbs hairy. 19. *C. submollis*

1. **C.** MONOGYNA Jacq. (*C. Oxyacantha* of Gray's Man., ed. 7. *C. oxycantha* of Cayuga Fl.) ENGLISH HAWTHORN.

Pastures, in gravelly or loamy subcalcareous soils; occasional. May 25–June 10; fr. Sept. 20–Oct.

Escaped from cultivation: near Cascade Pond, formerly (*D.*); Dwyer Pond; Cortland marl ponds; near Levanna; rather common in pastures and along the shore of Cayuga Lake at Farley Point (*D.*!); near Union Springs (*Wm. Moore*!); grassy levels in Big Gully (*D., Wm. Moore*). Apparently absent on the hills s. and s. e. of Ithaca.

Native of Eurasia.

Hybrids of this species with *C. punctata* were discovered by William Moore in 1909 in a pasture west of South Cortland crossroad and west of the railroad. Many small trees were present exhibiting various combinations of the characters of these two species, and the old parent tree of *C. monogyna* was near by. In 1920 the parent tree and most of the hybrids had been cleared away. At the same locality in 1920 were found some small trees which could be interpreted only as hybrids of *C. monogyna* and *C. coccinea.*

2. C. **Crus-galli** L. COCKSPUR THORN.

Pastures and roadsides, in heavy or light, more or less calcareous, soils; locally common. May 25–June 10; fr. Sept. 20–Oct.

E. side of Cayuga Lake from one mile n. of Hanshaw Schoolhouse (*Wm. Moore*) to Cayuga, and w. side of lake near Cayuga Lake Park; frequent about Montezuma and Cayuga Marshes; Junius; absent elsewhere.

N. N. Y. to Ont. and Kans., southw. to Ga. (*Eggleston*); apparently frequent on some parts of the Coastal Plain.

Thorns from medium to very long; flowers 16–18 mm. in diam.; sepals subentire; disk 2.5–3 mm. in diam.; styles (1) 2–3; fruit 10–15 mm. in diam., subglobose, dull crimson, the flesh juicy, often red. In the Cayuga Lake Basin this species occurs only on the bed of the old Lake Iroquois and the later glacial lakes, where, as is well known, many salt-loving plants occur. In New Jersey it is more common along the coast than inland (*Stone*), and may be influenced in both regions by the salts in the soil. Hybrids of this with other species are found on Hibiscus Point and Howland Point.

3. **C. punctata** Jacq.

Damp pastures and thickets, most abundant along streams, in various heavy or light, generally calcareous, soils; very common. May 25–June 5; fr. Sept. 20–Oct.

Que. to Minn., southw. to Pa., Ky., and Iowa (*Eggleston*).

Pedicels stout, some short; flowers rather few, 15–25 mm. broad; sepals narrow, subentire, reflexed; disk cup-shaped, 3–4 mm. in diam.; filaments slightly connate at base; anthers of medium size; fruit 12–22 mm. in diam., oblong-oval, purplish green or yellow, usually finely punctate; nutlets (2) 3 (4). This is the most abundant and the most generally distributed species, and is easily recognized at a distance by the characteristic horizontal gray branches. The period of flowering is between that of *C. Calpodendron* and that of the earlier-flowering species. The plants vary greatly in the depth of green color, the width and size of the leaf, the color of the fruit which may be either purplish green or bright yellow, and the color of the anthers which may be either deep purple or white. Further study may correlate these variations so that definite varieties may be formed. The red and the yellow fruits occur in this region in the ratio of 5 to 1. No relation has been found between the white and the purple anthers and the red and the yellow fruit. *C. punctata* apparently hybridizes with other species, and forms interpreted as *C. macrosperma* × *C. punctata* are rather abundant at Michigan Hollow and east of McLean.

4. **C. Margaretta** Ashe.

More or less calcareous gravels, or gravels and clay; scarce. May 10–30; fr. Sept.?

Base of hill n. of Slaterville Swamp; Six Mile Creek; Cayuga Heights; Salmon Creek valley; and perhaps elsewhere.

Range of this form of the species unknown.

Leaves about as broad as long, bluntish; flowers rather few, corymbose; bracts caducous; fruit globular, hard, dull, greenish or reddish. True *C. Margaretta* Ashe has a more western range. The plants here referred to that species have 3 styles and about 10 stamens, and are at least varietally distinct.

5. **C. Brainerdi** Sarg.

Pastures and roadsides, in gravelly, more or less calcareous, soils, very rarely in clay; frequent. May 15–25, rarely June 5; fr. Sept. 10–Oct.

Inlet Valley (Strattons to West Danby, many plants); Dwyer Pond (many plants); Cayuga Heights; Cascadilla Creek, toward Turkey Hill; Brookton to Slaterville; Varna station; Freeville to Dryden; McLean Bogs; near Chicago station; Esty; Mecklenburg to Cayuga Lake; Sheldrake to Hayt Corners and Romulus (many plants); Sawyer Creek to Cayuga.

N. E. to s. Wis., southw. to Pa. and Iowa (*Eggleston*); rare or absent on the Coastal Plain.

Flowers subcorymbose, numerous, all long-pedicelled; sepals only slightly serrate; stamens 10 or 20; filaments scarcely connate; anthers pink or white, of medium size; disk concave, 0.3–3.5 mm. in diam.; fruit ellipsoidal; hypanthium somewhat prominent; nutlets usually 3, often pitted on the inner faces. The forms referred with some hesitation to this species are variable, with either 20 or 7–10 stamens and pink or white anthers. The corymbs are usually villous, not glabrous as stated by Eggleston, and the nutlets are usually not clearly pitted and are irregular; the foliage, however, is very uniform in all cases. The structural characters of the local plants strongly suggest a hybrid origin, with possibly *C. macrosperma* and *C. succulenta*, or *C. macrosperma* and *C. punctata*, as parents. Because of the abundance of this form, it has seemed best to treat it as a species until its hybrid origin can be more definitely determined.

6. **C. macracantha** Lodd. (*C. macracantha* of Gray's Man., ed. 7. *C. succulenta*, in part, of Britton & Brown's Ill. Fl., ed. 2. *C. coccinea*, var. *macracantha* Dudley, of Cayuga Fl.) LONG-SPURRED THORN.

Pastures, thickets, and stream banks, in gravelly or stony, more or less calcareous, soils; scarce. May 25–June 8; fr. Sept. 20–Oct.

Headwaters of Lick Brook to Buttermilk Creek, one plant (*Wm. Moore*); South Hill, beyond the "Incline" (Morse Chain Works) and beyond survey station 420 (*D.*); campus brook at Barnes Hall (*D.*!); Cayuta Lake; Crowbar Point; Sheldrake to Hayt Corners (*Wm. Moore*); both shores of Cayuga Lake from Rocky Point northw. (*D.*); Union Springs, near shore and inland; near Scipioville. Not reported from the hills s. and e. of Ithaca or from the McLean region.

N. S. to Minn., southw. to N. C. and Nebr., and from Colo. northw. in the mts. (*Eggleston*); rare or absent on the Coastal Plain.

Leaves thick, little lobed, obovate-orbicular, subobtuse, parallel-veined; flowers rather numerous, 18–20 mm. in diam., some nearly sessile; sepals conspicuous, subpectinate; disk nearly flat, 3.5 mm. in diam.; filaments separate; anthers cream color or white, of medium size; fruit cherry red; nutlets usually 2, pitted on inner face but very indistinctly so in the local material; thorns often 10 cm. long, usually curved.

7. **C. succulenta** Schrad. (*C. succulenta* and *C. neofluvialis*, each in part, of Eggleston in Gray's Man., ed. 7 (as vars.), and in Britton & Brown's Ill. Fl., ed. 2.)

Pastures and thickets, in calcareous clays and lighter soils; frequent or locally abundant. May 25–June 5; fr. Oct.

Inlet Valley, Newfield; South Hill, near the "Incline"; Dwyer Pond; Ellis Hollow, w. of swamp; Cayuga Heights and toward Esty, frequent; Shurger Glen; Salmon Creek valley, in Lansing and Genoa; near Pleasant Valley, Groton; Levanna to Sawyer Creek, frequent (*Wm. Moore*); Farley Point. Not reported from the w. side of Cayuga Lake, from the hills s. and s. e. of Ithaca, or from the McLean region.

W. Vt. to e. Wis., southw. to N. C. and Iowa (*Eggleston*); rare or absent on the Coastal Plain.

Leaves thick, more or less glossy above, obovate, little lobed, obtuse or acute, parallel-veined; flowers numerous, 17–18 mm. in diam., all on pedicels 6–18 mm. long; sepals broader than in no. 8, more conspicuous, and more strongly serrate; disk shallow, 2.5–4 mm. in diam.; filaments free or nearly so; anthers pink; fruit deep red; nutlets pitted on inner face. The broad spreading sepals of *C. succulenta* are not found in either *C. macracantha* or *C. Calpodendron.* Some plants on Cayuga Heights have 10 stamens and large anthers, and are probably hybrids of *C. succulenta* with some other species. The name of this species is here interpreted in the light of several European specimens of some historical importance labeled *C. succulenta,* in the herbarium of the Arnold Arboretum. These, together with the original description, indicate that Schrader's plant was the present species.

8. **C. Calpodendron** (Ehrh.) Medic. (*C. Chapmani* Ashe, var. *Plukenetii* Eggleston. *C. tomentosa,* wholly or in part, of Cayuga Fl. *C. tomentosa* of Sargent.)

Pastures and thickets, in the heavy clays and in the lighter calcareous glacial soils; frequent or locally abundant. June 7–20; fr. Sept. 20–Oct.

Frequent in the valley of Cayuga Lake, becoming more abundant in the vicinity *of Union Springs and Sawyer Creek: South Hill, along old railroad bed and near* the "Incline"; mouth of Coy Glen and southw.; along Six Mile Creek; near Judd Falls; Forest Home; Cayuga Heights (frequent); Asbury; Salmon Creek valley, in Genoa; Romulus; near Cayuga Lake Park; lake shore n. and s. of Union Springs; Sawyer Creek, abundant (*Wm. Moore*); Phillips Pond. Not reported from the hills s. and e. of Ithaca or from the McLean region.

Cent. N. Y. to Minn., southw. to n. N. J., Pa., and Mo., and in the mts. to Ga. (*Eggleston*).

Twigs in the second year granulose from the weathered-off pubescence; leaves yellowish green, usually dull, rather thin, more or less lobed and subacute; flowers numerous, 13–15 mm. in diam., some nearly sessile; sepals linear-lanceolate, only slightly serrate; disk flat, 3–3.3 mm. in diam.; filaments slightly connate at base; anthers purple; fruit orange-red or cherry red; nutlets pitted on inner face. The latest-flowering species, in flower several weeks after the other species are through. The plants are still without foliage and appear dead when other thorns have put forth young leaves.

9. **C. intricata** Lange. (*C. coccinea of* Gray's *Man., ed. 7.*)

Pasture land; rare. June 1–15; fr. Oct.

Collected without definite locality or indication of soil type in a pasture w. of Paine Creek, presumably about 1½ miles from the mouth of the creek, 1915 (*K. M. W.*). The general soil of this region is stony clay.

W. N. E. and N. Y., to S. C. and Mo. (*Eggleston*); rare or absent on the Coastal Plain.

Anthers cream-colored; fruit globular, yellowish green or reddish brown, usually pubescent.

10. **C. Boyntoni** Beadle. (Including *C. foetida* Ashe.)

Stony upland pastures, fence rows, and thickets, mostly in subneutral stony clays, rarely in lighter soils; infrequent. May 28–June 5, rarely June 10; fr. Oct. In flower later than members of the *pruinosa* group.

South Hill, near the "Incline" and on the survey-station plateau; woodland, n. side of Coy Glen; clay pasture, Dwyer Pond; Cornell Heights; lake slope from Renwick to Esty; ravine near Shurger Glen; Kennedy Corners; bank of Phillips Pond (somewhat transitional to *C. straminea*). Not found on the chestnut soils w. and s. of Ithaca, in the McLean region, or on the more calcareous soils northw.

E. Mass. to Mich., southw. to S. C. and Tenn. (*Eggleston*); rare or absent on the Coastal Plain.

Flowers 5–8 in number, 25–30 mm. in diam.; filaments free; anthers cream-colored; fresh, unopened anthers large, 2.5–3 mm. long; disk 5 mm. in diam.; fruit globular, yellowish green tinged with red.

11. **C. straminea** Beadle. (*C. apposita* of Gray's Man., ed. 7.)

In upland clay soil or in clay mixed with gravel or stone; infrequent. May 28–June 14; fr. Sept. 15–Oct.

E. of South Hill Marsh; n. bank of Coy Glen; pasture, Dwyer Pond; several unlabeled specimens, probably from elsewhere.

W. Vt. to s. Mich., southw. through Conn. and Del. to n. Ala. and s. Mo. (*Eggleston*); rare or absent on the Coastal Plain.

Anthers cream-colored; fruit ellipsoidal or subglobose, yellowish green or reddish. The above-listed specimens are not clearly distinct from *C. Boyntoni*, the exact identification being in many cases very difficult. They are here treated provisionally as a separate species.

12. **C. pruinosa** (Wendl.) K. Koch. (Doubtfully *C. pruinosa* of Eggleston.)

Upland pastures and thickets, mostly in heavy clay soil; common. May 10–25, rarely to June 10; fr. Oct. 20 or later.

Especially abundant on Cayuga Heights northw. to Esty or beyond, but frequent also on the n. e. slope of South Hill, and found sparingly elsewhere: top of North Pinnacle, Caroline; s. of Newfield station; hillside n. of Buttermilk Glen; South Hill, near the "Incline" and s. of Coddington Road; Cayuga Heights and northw.; Shurger Glen; n. of Big Gully.

W. N. E. to Mich., southw. to N. C. and Mo. (*Eggleston*); rare or absent on the Coastal Plain.

Flowers 18–20 (25) mm. in diam.; fresh, unopened anthers 1.8–2 mm. long. *C. pruinosa* apparently hybridizes with several other species. A number of plants at Dwyer Pond and one on Cayuga Heights, answering to *C. Macauleyae* Sarg., are to be interpreted as *C. pruinosa* or *C. Boyntoni* × *C. punctata* or *C. Brainerdi*. Some plants at Dwyer Pond with broad, shallowly many-lobed leaves, are probably *C. pruinosa* or *C. beata* × *C. coccinea* (?*C. rugosa* Ashe). *C. filipes* is variable and gives the impression of a hybrid of *C. pruinosa* and *C. macrosperma*. Other forms occur occasionally, but these can generally be interpreted as crosses between *C. pruinosa* and other species in the vicinity. *C. pruinosa* and *C.* sp. (no. 13) are the only species with extremely glaucous fruit. The fruit of *C. beata* and that of *C. Crus-galli* are usually somewhat glaucous. This use of the name *C. pruinosa* is supported by specimens so named, from European gardens.

13. **C.** sp.

Clay soil; local. May 10–25; fr. Oct.

South Hill, near the Cayuga St. extension and s. of Coddington Road; Six Mile Creek, at crossroad above upper reservoir; Dwyer Pond.

These plants are distinguished from all other relatives of *C. pruinosa* in the Cayuga flora by the combined characters of large flowers (20–25 mm. in diam.), pale pink anthers, drooping long-pedicelled red fruit, and bluntly toothed, rounded leaves. Efforts to detect the form among the mass of published names in Crataegus have so far been unsuccessful, and it has not been seen from elsewhere in herbaria; yet no combination of local species can account for its characters as a hybrid.

14. **C. beata** Sarg. (Including *C. leiophylla* Sarg.)

Upland pastures and thickets, in soils somewhat lighter than the preceding but still containing some clay; occasional. May 10–25, rarely June 10; fr. Oct.

Summit Marsh; Michigan Hollow; near Trumbull Corners; Dwyer Pond (abundant); Cayuga Heights (frequent); Union Springs; (planted near the Agricultural College).

S. Ont. to w. Penn. (*Eggleston*).

The leaves vary from slightly to sharply lobed. This form was at first interpreted as *C. macrosperma* or *C. coccinea* × *C. pruinosa,* as it combines characters of these species without any pronounced new ones. However, the anthers are of a deeper purple than those of any other species, and the flowers are larger than those of either supposed parent. The plant was found to be fairly abundant about Pulaski, N. Y., where extended search failed to reveal a single specimen of *C. pruinosa.* For the present it has seemed best to treat *C. beata* as a species, but it should receive further study. Certain specimens seem to indicate that it, itself, may hybridize with other species.

15. **C. filipes** Ashe. (*C. silvicola* Beadle?)

Upland pastures and thickets, if not too dry, in gravelly soils mixed with clay; frequent, and locally abundant. May 10–25, rarely to June 10; fr. Sept. 20–Oct.

Inlet Valley, near Strattons; Michigan Hollow; 1½ miles s. of Kennedy Corners; n. e. slope of South Hill, frequent; Six Mile Creek, abundant; near Barnes Hall; Dwyer Pond (?); Ellis Hollow, n. of swamp (abundant); and perhaps elsewhere nearer the lake.

W. N. E. to cent. Mich., southw. to Pa. (*Eggleston*).

Anthers purple; fruit oval-oblong; cymes and fruit glabrous. Plants referred to this species are variable, and quite possibly represent a hybrid of *C. pruinosa* with the various forms of *C. macrosperma,* as the leaves have the texture of *C. pruinosa* and the outline of *C. macrosperma,* while the fruit is like that of the latter species. The abundance of this form, especially in certain localities where *C. pruinosa* is rare, as at Ellis Hollow, and the general uncertainty as to its status, have led to its retention here as a provisional species. The outline of the fruit of *C. filipes* and *C. beata* in this region does not agree with that stated by Eggleston.

16. **C. macrosperma** Ashe.

Upland pastures, hedgerows, and thickets, widely distributed, but more often in light soils, rarely on the heavy clay; common. May 10–25, rarely June 5; fr. Sept. 10 or later.

In almost all parts of the Cayuga Lake Basin, and, with the occasional exception of *C. Boyntoni,* the only species found in sandy chestnut soils. In gravelly soils, usually associated with *C. coccinea,* with *C. Holmesiana,* and, if the soil is not too dry, with *C. punctata.*

N. S. and Me. to s. e. Minn., southw. to N. C. and Tenn. (*Eggleston*); occasional on the Coastal Plain.

Flowers 15–17 mm. in diam.; fresh, unopened anthers 1.5–1.7 mm. long; disk 3–4 mm. in diam.; corymbs and fruit usually glabrous; fruit ellipsoidal to globose-oval. This species as locally understood is highly variable. Several strains have been detected which probably represent good varieties. *C. macrosperma* apparently hybridizes with *C. punctata, C. pruinosa,* and probably other species.

17. **C. Holmesiana** Ashe. (*C. villipes* Ashe.)

Thickets and pastures, in gravelly soil but apparently not associated with chestnut and Vaccinium; frequent. May 10–30; fr. Sept.

Michigan Hollow, abundant; slope of South Hill; Coy Glen and vicinity; Waterburg to Mecklenburg; s. of Trumansburg; Cayuga Heights; Esty; Ellis Hollow; e. of Chicago Bog (frequent); Pleasant Valley, Groton; Shurger Glen; n. of Union Springs.

Me. and Que. to cent. Mich., southw. in the mts. to N. C. (*Eggleston*).

Flowers few, 25–27 mm. in diam.; fresh, unopened anthers 1.9–2.5 mm. long; disk 4–5 mm. in diam. Apparently a valid species, though closely related to *C. coccinea,* and at first thought to be a hybrid of that species and *C. macrosperma.* Opposed to this latter view are the broad sepals, more dilated than in *C. coccinea.*

18. **C. coccinea** L. (*C. Elwangeriana* Sarg., *C. pedicellata* Sarg., and possibly also *C. Pringlei* Sarg. and *C. albicans* Ashe.)

Upland pastures and thickets, in gravelly soils or in mixed clays and gravels, but less abundant on the heaviest clays; common. May 10–15, rarely June 5; fr. Sept.

Widely distributed throughout the basin, but apparently absent on the chestnut soils. Very abundant in the McLean and West Groton districts, and frequent along both sides of Cayuga Lake, but not seen on the hills s. of Ithaca beyond South Hill.

Conn. to Ont. and Ill., southw. to Del. and Pa. (*Eggleston*); rare or absent on the Coastal Plain.

Apparently this plant hybridizes with *C. pruinosa* and *C. beata,* and probably with several other species. In the Cayuga Lake Basin it is represented by several strains which may prove to be distinct: (*a*) Leaves broadly ovate-oval, with spreading lobes and generally with truncate or rounded bases; fruit subpyriform, at least when dry (typical *C. coccinea* L.?). (*b*) Leaves oval or suborbicular, rounded at base and somewhat above, lobes shallow; fruit subglobose, at least when dry (*C. Pringlei* Sarg.). (*c*) Leaves broadly ovate-oval, generally fewer-veined, those on the shoots subcordate; lobes as in form *a;* fruit oval (*C. albicans* Ashe?). The strains apparently intergrade.

19. **C. submollis** Sarg. (*C. champlainensis* Sarg.?)

Hedgerows, in gravelly, more or less calcareous, soils; rare. May 10–30; fr. Sept.

Butternut Creek, e. of Trumbull Corners (*Wm. Moore*!); Elm St., Ithaca, one mile out (*Wm. Moore*!); Howland Point; outlet of the north spring, Union Springs.

Que to s. Ont., southw. to Mass. and N. Y. (*Eggleston*).

In the plants of the Cayuga Lake Basin the leaf base is scarcely more cuneate than in the western *C. mollis,* instead of plainly cuneate as stated for *C. submollis* by Eggleston. However, the stamens are 10 instead of 20, and, since the eastern plants generally have 10 stamens while the western plants have 20, it is probably wise for the present to segregate these under Sargent's name, *C. submollis.*

12. **Fragaria** (Tourn.) L.

a. Plant large and coarse; leaves rugose, hairy, with blunt or merely acute teeth; flowers in large or medium-sized corymbs. [*F. chiloënsis,* var. *ananassa*]

a. Plant smaller and more slender; leaves scarcely rugose; teeth sharp.

- *b.* Flowers in corymbs: achenes immersed in pits in the flesh of the receptacle; leaflets dull glaucous green above, not rugose, with ascending veins and teeth; surface between the veins beneath glabrous or nearly so; flowers generally 20 mm. in diam.
  - *c.* Plant small or of medium size; hairs of the pedicels usually appressed. 1. *F. virginiana*
  - *c.* Plant coarser and larger; hairs of both scapes and pedicels spreading. 1a. *F. v.,* var. *illinoënsis*
- *b.* Flowers in panicles or proliferous umbels; achenes superficial; leaflets bright green above, more or less impressed veiny, with more spreading veins and teeth; surface between the veins beneath silky; flowers about 13 mm. in diam.
  - *c.* Plant not slender, more or less villous with spreading hairs on the petioles and peduncles; fruit red or white. 2. *F. vesca*
  - *c.* Plant slender, with thin leaves; pubescence sparse and more appressed; fruit red. 2a. *F. v.,* var. *americana*

[F. CHILOËNSIS Duch., var. ANANASSA Hort. GARDEN STRAWBERRY.

Occasionally escaping to roadsides, or remaining in former berry fields; not permanent.]

1. **F. virginiana** Duch. FIELD STRAWBERRY.

Gravelly or sandy fields and banks, in acid or neutral soils; common. May 10–June 15.

Much less abundant, or rare, in the clay soils and alluviums of the basin.

Newf. to S. Dak., southw. to Fla. and Okla., including the Coastal Plain.

1a. **F. virginiana** Duch., var. **illinoënsis** (Prince) Gray.

In situations similar to the preceding, or somewhat richer; frequent.

In alluvial woods, Inlet Valley, Newfield; hills s. of Newfield village; South Hill; on a knoll, e. end of McLean Bogs.

W. N. Y. to Minn., southw. to Ala., La., and Mo. (According to Britton, the eastern limit is Md.)

Not well marked here. Dudley says: "In richer soil [than the preceding]. Six Mile Cr. South Hill and near Cayuga L."

2. F. VESCA L.

Roadsides, in gravelly soil; frequent, becoming more common. May 10–June 15.

E. of Michigan Hollow; hills s. of Newfield village; lighthouse road, Ithaca; talus in Fall Creek Gorge; Cayuga Heights to Esty, common; Union Springs; e. side of Stark Pond; and elsewhere.

Newf. to Ohio, southw. to Pa. and Ky. Probably introduced from Eu.

A form with white fruit (forma *alba* (Ehrh.) Rydb., Mem. Dept. Bot. Columbia Univ. **2**: 174, 1898) is occasional: Snyder Hill; Beebe Lake (*J. H. Comstock*, D.); Hanshaw Corners; between Groton and Cortland; Sherwood (*D.*); Black Brook, Tyre; e. of Stark Pond. This form, even more than the typical form, has the appearance of having been introduced.

2a. **F. vesca** L., var. **americana** Porter.

Shady ravines and damp shady gravelly or rocky woods, in limy regions; common. May 10–June 15.

In all the ravines of the basin, and in woodlands in the McLean district and elsewhere.

Newf. to Man., southw. to Va. and N. Mex.; rare or absent on the Coastal Plain. Native of N. A.

13. Duchesnea Smith

1. **D.** INDICA (Andr.) Focke. INDIAN STRAWBERRY.

Waste places and lawns, mostly in shade; rare. May–June.

Drive n. w. of Chi Psi house, Ithaca, 1918 and 1920 (*A. R. Bechtel*); yard, E. Seneca St., 1920 (*G. W. Tailby*).

S. N. Y. to Mo., southw. to Fla. and Ark. Naturalized from Eurasia.

14. Waldsteinia Willd.

1. **W. fragarioides** (Michx.) Tratt. BARREN STRAWBERRY.

Dry open sterile woodlands and banks, mostly in residual soils from sandstone; common. Apr. 25–May 20.

N. B. (?) and w. N. E. to Minn., southw. to Ga., Ind., and Mich.; rare or absent on the Coastal Plain.

15. Potentilla L.

a. Stems distinctly shrubby, diffusely branched; style clavate, lateral.
1. *P. fruticosa*

a. Stems herbaceous.
  b. Leaves pinnate; styles lateral or subbasal.
    c. Calyx purple; leaves not rugose, glaucous. 2. *P. palustris*
    c. Calyx green; leaves more veiny, not glaucous.
      d. Flowers cymose; style glandular-fusiform; leaves hirsute.
3. *P. arguta*
      d. Flowers solitary; style filiform; leaves white-tomentose beneath.
4. *P. Anserina*
  b. Leaves palmate; style terminal or nearly so.
    c. Flowers cymose.
      d. Leaflets green beneath.
        e. Leaflets 5–9.
          f. Petals 8–10 mm. long, exceeding the calyx, pale yellow; stems green.
5. *P. recta*
          f. Petals 3–7 mm. long, exceeding the calyx or shorter, deep yellow; stems reddish; leaflets broader and deeper green. 5a. *P. r.*, var. *obscura*
        e. Leaflets 3; petals shorter than the sepals, deep yellow.
6. *P. norvegica*, var. *hirsuta*
      d. Leaflets white-tomentose beneath, 5; petals small. 7. *P. argentea*
    c. Flowers solitary along the runner-like stems.
      d. First flower from the node above the first well-developed internode; plant small, creeping; leaflets dull, scarcely veiny, narrowly obovate.
8. *P. pumila*
      d. First flower from the node above the second or third well-developed internode; plant larger, less close to the ground; leaflets brighter green, more veiny, oblanceolate.
        e. Stems with spreading hairs. 9. *P. canadensis*
        e. Stems with appressed hairs, or glabrate. 9a. *P. c.*, var. *simplex*

1. **P. fruticosa** L. SHRUBBY CINQUEFOIL.

Boggy meadows, in calcareous soils; scarce. June 20–Aug. 1.

Summit Marsh, e. side (*D.*); springy spot by railroad grade e. of Key Hill Swamp; McLean Bogs, e. end (*D.*); Lake Como (Locke Pond), above the bridge (*D.*); Newton Ponds (*D.!*); arbor vitae swamp e. of Clyde; Miller Bog, Spring Lake; Stark Pond.

Greenland and Lab. to Alaska, southw. to n. N. J., Pa., Ill., Iowa, Ariz., and Colo.; rare or absent on the Atlantic Coastal Plain. Found also in Eurasia.

2. **P. palustris** (L.) Scop. MARSH CINQUEFOIL.

Swales and bogs, in neutral or acid waters; infrequent. June 10–July 20.

Cayuta Lake (*D.*); middle Round Marsh, McLean Bogs (*D.!*); Chicago Bog (*D.!*); Lake Como (Locke Pond, *D.*); Cayuga Marshes, from Cayuga to Montezuma (*D.*); Vandemark Pond (*D.!*); s. of Featherbed Bog.

Greenland and Lab. to Alaska, southw. to n. N. J., Pa., Ohio, Ind., Ill., Iowa, Wyo., and Calif.; infrequent on the Atlantic Coastal Plain. Found also in Eurasia.

At Chicago Bog all gradations are found between plants with leaves glabrous above and those with a dense silky covering; also between plants of both of the above-named types with densely glandular pedicels and those with no glands. The leaflets, however, are all of the same shape. Therefore, in the Cayuga Lake Basin the varieties of this species (see Rhodora **11**: 48, 1909; **12**: 140, 1910; and **16**: 5, 1914) cannot be clearly defined.

3. **P. arguta** Pursh.

Dry rocky banks and in sandy or gravelly fields, in nearly neutral soils; scarce. May 20–Aug.

Indigenous apparently along the lake shore s. of Esty Glen (*D.*!), and possibly also s. of the Fleming Schoolhouse (*D.*). Adventive as a weed: sandy sterile soils, top of North Pinnacle, Caroline; near Headwaters Swamp; dry pasture s. e. of Buttermilk Falls; s. of McLean, 1881 (*D.*); gravelly knoll near Malloryville Bog; sandy pasture, crest of Salmon Creek ravine s. of Genoa.

E. Que. and N. B. to Alaska, southw. to Va., Ill., Kans., and Colo.; rare or absent on the Atlantic Coastal Plain.

4. **P. Anserina** L. SILVERWEED.

Calcareous or saline, sandy or gravelly, shores; frequent. June–Aug.

Summit Marsh (*D.*); Cayuta Lake (*D.*); Cortland marl ponds (*D.*!); lake shore, Renwick (*D.*!); "on all the sandy points to Cayuga and Montezuma Marshes" (*D.*); Venice Center; Aurora; Union Springs; Cayuga Lake Park.

Arctic Am., southw. to n. N. J., Ohio, Iowa, N. Mex., and Calif. Regarded by some botanists as introduced in the eastern U. S.

5. **P.** RECTA L. (*P. sulphurea* Lam.)

Dry fields and roadsides, usually in the lighter nonacid soils; abundant but local. June 20–Aug. 10.

First reported from "near Union Springs, 1875" (*D.*); in recent years becoming rapidly more abundant, and now common on Cornell and Cayuga Heights and between Cayuga and Seneca Lakes; elsewhere mostly absent, or infrequent.

Me. to Mich., southw. to Va. and Ill. Naturalized from Eu.

Following many early authors, *P. recta* is here made a synonym of *P. sulphurea* Lam., rather than of the var. *obscura*.

5a. **P.** RECTA L., var. OBSCURA Koch. (See Wolf in Bibliot. Bot. **16**, Heft 71: 343. 1908. *P. recta* Rydb. in N. A. Flora **22**: 309. 1908.)

In a waste scrubby field at the mouth of Big Gully, 1919 (*K. M. W., A. J. E., & L. F. Randolph*).

Infrequent in Europe, and apparently only occasional in the United States. The petals of the Big Gully specimens slightly exceed the sepals, while in European specimens the petals are shorter than the sepals. The appearance of both American and European specimens strongly suggests a hybrid origin, with *P. recta* and *P. norvegica* as parents.

6. **P. norvegica** L., var. **hirsuta** (Michx.) Lehm. (See Bibliot. Bot. **16**, Heft 71: 404. 1908. *P. monspeliensis* of Gray's Man., ed. 7. *P. norvegica* of Cayuga Fl.) CINQUEFOIL.

A weed in cultivated fields and in waste places, in moist rich soils; common. July (Aug.–Oct.).

Lab. to Alaska, southw. to D. C., Mo., Kans., and N. Mex., including the Atlantic Coastal Plain. Found also in Asia. Possibly not native.

7. **P. argentea** L. SILVERY CINQUEFOIL.

Dry gravelly or rocky hillsides and in sterile sandy lawns, in both acid and calcareous regions; frequent. June–July.

N. S. to Dak., southw. to D. C., Ind., and Kans., including the Coastal Plain. Found also in Eu. Possibly introduced in Am.

8. **P. pumila** Poir.

Dry sandy or gravelly sterile fields, in neutral or acid soils; frequent. May–June 15.

North Spencer; n. of South Hill Marsh; Varna; between Freeville and Mud Creek; lake slope between Renwick and Esty, common; and elsewhere.

N. S. to Ont., southw. to Pa. and Ohio, including the coastal region.

9. **P. canadensis** L. COMMON CINQUEFOIL. FIVE-FINGER.

Dry fields and thickets, in gravelly or sandy soils less sterile than the last preceding; common. May 20–July 1.

S. Me. to Minn., southw. to Ga. and Tex., including the Coastal Plain.

9a. **P. canadensis** L., var. **simplex** (Michx.) T. & G.

In situations similar to the preceding, but especially in more sterile localities; scarce.

Top of hill e. of Inlet, Ithaca-Newfield town line; hilltop, Caroline; between Etna and Ringwood; two miles n. w. of Freeville; and probably elsewhere.

Range nearly as in the typical form, but extending to N. S. and Newf.

16. Geum L.

a. Upper joint of the style hairy, deciduous; calyx green; petals white or yellow.
  b. Petals white or greenish yellow, as long as the calyx or shorter; stipules generally small, 7–15 (20) mm. long; some basal leaves usually trifoliolate or rounded and unlobed.
    c. Plant slender, sparingly soft-hairy; receptacle of fruit densely bristly; achenes bristly; petals broad, equaling the sepals.
      d. Achenes 30–60, broadly ovate to obovate, 2.5–3 mm. long; heads of fruit globose; peduncles finely velvety; leaves thin. 1. *G. canadense*
      d. Achenes 60–160, narrowly obovate to cuneate, 3–4 mm. long; heads globose or obovoid; peduncles with longer hairs; leaves firmer. 1a. *G. c.*, var. *camporum*
    c. Plant stout, bristly-hairy; heads of fruit globose; receptacle glabrous or nearly so; achenes glabrous or rarely setose; petals about half the length of the sepals, small and narrow. 2. *G. virginianum*
  b. Petals yellow, broadly obovate, usually slightly longer than the calyx; stipules large, 15–40 mm. long and more incised; leaves usually all pinnate, the basal ones more sharply incised; heads of fruit obovoid; receptacle downy; achenes hispid; stems hispid. 3. *G. strictum*
a. Upper joint of the style plumose; calyx purple; petals very short, greenish or purplish cream-color. 4. *G. rivale*

1. **G. canadense** Jacq. (*G. album* of Cayuga Fl.) WHITE AVENS.

Damp thickets and shaded banks, in various soils; common. June 20–July.

N. S. to S. Dak., southw. to Ga., La., and Kans.; less common on the Coastal Plain.

1a. **G. canadense** Jacq., var. **camporum** (Rydb.) Fernald & Weatherby. (See Rhodora **24**: 47. 1922.)

In situations similar to the preceding or more open; apparently occasional.

Spencer Lake; Six Mile Creek (*E. L. Palmer*); bank near East Ithaca (*Palmer*); Cayuga Heights; and elsewhere.

N. B. to N. Dak., southw. to Ala. and Okla.

2. **G. virginianum** L. BRISTLY WHITE AVENS.

Open swampy banks and hedgerows, in the heavier soils; frequent. June 10–July 10.

N. S. to Minn., southw. to Pa., Ohio, Ill., and Mo., and in the mts. to Ga.; rare or absent on the Coastal Plain.

All specimens from the Cayuga Lake Basin, except one from a brackish field near Montezuma, are var. *Murrayanum* Fernald (see Rhodora 25: 99. 1923). The achenes of the Montezuma plant are abundantly setose.

3. **G. strictum** Ait. YELLOW AVENS.

Moist thickets and fields, more frequently in calcareous gravels but also in other rich soils; common. June 15–July 15.

Newf. to B. C., southw. to N. J., Pa., Ill., Mo., and N. Mex.; rare or absent on the Atlantic Coastal Plain. Found also in Asia.

4. **G. rivale** L. WATER OR PURPLE AVENS.

Boggy springy places, in both calcareous and acid soils; frequent. May 15–June.

Marshes of Danby (*D.*); near Key Hill; Inlet Valley, Ithaca-Newfield town line; s. of Fall Creek, near Forest Home; e. of Slaterville; Ellis Hollow (*D.*!); Ringwood; marshes of Dryden (*D.*!); McLean Bogs.

Lab. to Sask., southw. to n. N. J., Pa., Mich., and Colo., including the northern Coastal Plain. Found also in Eu.

17. **Rubus** (Tourn.) L.[23]

a. Leaves simple, 3–5-lobed; stems unarmed; petals very large, purple. 1. *R. odoratus*

a. Leaves 3–7-foliolate; stems with or without prickles; petals white.

b. Leaves white-tomentose beneath; fruit separating easily from the receptacle; petals not longer than the sepals.

c. Canes erect, bronzy, bristly-prickly; plant stoloniferous; fruit red.

d. Pedicels not setose. 2. *R. idaeus*

d. Pedicels densely setose. 2a. *R. idaeus,* var. *strigosus*

c. Canes recurved, dark purple, glaucous, with stout hooked prickles; plants in clumps, not stoloniferous; fruit black. 3. *R. occidentalis*

b. Leaves not tomentose beneath; fruit not separating from the receptacle.

c. Petals scarcely longer than the sepals, narrow; plants herbaceous, unarmed; fruit purple-red. 4. *R. pubescens*

c. Petals much longer than the sepals, broader; canes woody, usually armed; fruit black.

d. Leaflets laciniate, thick; calyx prickly. 5. *R. laciniatus*

d. Leaflets not laciniate; calyx not prickly, or with an occasional prickle.

e. Young canes setose or with very slender prickles; body of sepals about 3 mm. long; petals mostly less than 1 cm. long; leaves glabrous beneath, or sparingly strigose on the veins.

f. Plants trailing; racemes short, few-flowered, lax, often leafy-bracted; leaves subevergreen, firm, and often glossy. 6. *R. hispidus*

f. Plants low-arching, often forming large beds; racemes more numerously flowered, more or less paniculate; flowers larger, often double, frequently pinkish and fragrant; leaves deciduous, though rather firm. 7. *R. jacens*

e. Young canes prickly or unarmed; body of sepals 5 mm. long or more; petals mostly over 1 cm. long; leaves glabrous or velvety beneath, thinner, not evergreen.

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[23] Compare also Bailey, L. H., Sketch of the evolution of our native fruits, 1898; and Gentes Herbarum, vol. 1, fasc. 4 and 5, 1923 and 1925.

f. Stems trailing; inflorescence corymbosely few-flowered, with leaf-like bracts, not glandular; leaflets few-veined, broad and short, villous only along the veins beneath. 8. *R. flagellaris*

f. Stems arching; inflorescence subcorymbose, with leaf-like bracts; leaflets villous throughout beneath. 9. *R. frondosus*

f. Stems erect or arching; inflorescence racemosely many-flowered; bracts, except the lowermost, not leaf-like.

g. Inflorescence not glandular.

h. Leaves nearly or quite glabrous except on the veins beneath; canes almost or quite unarmed. 10. *R. canadensis*

h. Leaves velvety beneath; canes prickly. 11. *R. pergratus*

g. Inflorescence glandular; leaves velvety over the entire surface beneath; canes with stout, mostly hooked, prickles. 12. *R. allegheniensis*

1. **R. odoratus** L. FLOWERING RASPBERRY.

Moist rocky or gravelly banks, in calcareous regions; common. June–July.

Most abundant in the ravines of the basin, and on the cliffs along Cayuga Lake; rare or absent in chestnut woods and in ericaceous regions.

N. S. to Mich., southw. to Ga. and Tenn.; rare or absent on the Coastal Plain.

2. R. IDAEUS L. RED RASPBERRY.

Roadsides and waste places, occasionally escaping from cultivation.

2a. **R. idaeus** L., var. **strigosus** (Michx.) Maxim. (See Rhodora **21**:89. 1919. *R. i.*, var. *aculeatissimus*, of Gray's Man., ed. 7. *R. strigosus* of Cayuga Fl.) RED RASPBERRY.

Dry gravelly thickets, borders of woods, and swamps, in more or less calcareous regions; common. June.

S. Newf. to B. C., southw. to Va., the Great Lakes, and Wyo.; much less frequent on the Atlantic Coastal Plain. Found also in e. Asia.

A form with yellowish white fruit (forma *albus* (Fuller) Fernald) has been found at the McLean Bogs and in Cascadilla Glen.

3. **R. occidentalis** L. BLACK RASPBERRY. THIMBLEBERRY.

Dry thickets, banks, and fence rows, in stony or clayey, neutral or subcalcareous, soils, preferring heavier soils than the preceding; common. June.

N. B. to s. Que. and Ont., southw. to Ga. and Mo., including the Coastal Plain.

Plants answering to *R. neglectus* Peck are frequent. These differ in the maroon-colored or purple fruits and the more setiform prickles, a combination of the characters of *R. occidentalis* and *R. idaeus*, var. *strigosus*. These forms are probably of hybrid origin, with the above-mentioned species as parents.

4. **R. pubescens** Raf. (See Rhodora **11**:236. 1909. *R. triflorus* of Gray's Man., ed. 7, and of Cayuga Fl.)

Swampy woods and often on wet rocks, in calcareous regions; frequent. May.

Michigan Hollow Swamp; near Key Hill; lower Enfield Glen; Buttermilk Glen; Caroline; Ellis Hollow; swamps of Dryden; and elsewhere.

Lab. to Alaska, southw. to n. N. J., Pa., Iowa, and Nebr. A distinctly northern species.

5. R. LACINIATUS Willd.

Roadsides and thickets, in gravelly or sandy, rather rich, soils; rare. July.

Roadside near Mud Pond, Conquest (*L. H. MacDaniels & P. A. Munz*).

Occasionally escaped from cultivation: N. Y., e. Pa., and Del. Origin not clear.

6. **R. hispidus** L.

Borders of thickets and swamps, in peaty acid soils; frequent. June 25–July 25.

Larch Meadow (*D.*); South Hill Marsh (*D.*); Ringwood; Slaterville; Woodwardia Bog; McLean Bogs; Beaver Brook; Chicago Bog; Conquest; and elsewhere.

N. S. to s. w. Ont. and Minn., southw. to Ga. and Kans.; common in the coastal swamps.

The fruit of this species is black, not red nor purple as frequently stated.

7. **R. jacens** Blanchard.

Borders of peat bogs; rare. June 20–July 15.

McLean Bogs; Chicago Bog.

N. S. to N. H. and N. Y.

Specimens from the above-named stations match very well those of *R. jacens* in the Gray Herbarium. They have less acuminate leaflets on the sterile canes than have *R. vermontanus* and *R. setosus.* They evidently belong to the group of *R. setosus* Bigel. or *R. nigricans* Rydb., but this whole group should receive more study.

8. **R. flagellaris** Willd. (*R. villosus* of Gray's Man., ed. 7, not Ait.(?). *R. canadensis* of Cayuga Fl., not L. *R. procumbens* of authors.) DEWBERRY.

Dry sandy or gravelly banks, mostly in acid soils; frequent. June.

South Hill, near the marsh; Coy Glen; Cornell and Cayuga Heights; Renwick slope; and elsewhere.

Me. to Minn., southw. to Va., La., and Okla., and possibly also in other southern States; common on the Coastal Plain.

Bailey's figure of Aiton's *R. villosus* (see Gentes Herb. 1, fasc. 4: 139, 1923) does not resemble the local dewberry in foliage; and since *R. procumbens* Muhl. is either a *nomen subnudum* or a synonym of *R. trivialis* Michx., the only available name for this species is *R. flagellaris* Willd. Bailey's figure of the type of *R. flagellaris* can scarcely be other than the present plant.

This species appears to hybridize freely with other species, especially with *R. allegheniensis.* The commoner types are: (1) canes tall and erect, and flower clusters elongated but not glandular; (2) canes strongly arching, flower clusters short-corymbose, leafy, nonglandular, and leaves coarsely toothed; (3), canes prostrate, and flower clusters corymbose. These forms usually have petals broader and more erect than those of *R. allegheniensis,* resembling more those of *R. flagellaris.* The fruits of forms 2 and 3, at least, have large drupelets as in *R. flagellaris,* and these are frequently abortive to the extent of from 30 to 60 per cent. The under surface of the leaves is usually villous in all forms, but the leaf outline, dentation, and venation are highly variable. Less frequent individuals occur connecting these forms by a recombination of characters. All circumstantial evidence points to these various forms as hybrids of *R. flagellaris* and *R. allegheniensis.* No. 1 corresponds closely to *R. pergratus* Blanchard; no. 2 to *R. frondosus* Bigel. and *R. recurvans* Blanchard; and no. 3 to *R. invisus* Bailey, *R. Baileyanus* Britton, and *R. villosus,* var. *humifusus* T. & G. In the last-named group particularly there is a great diversity of form. Since no. 2 is so abundant and widely distributed in the flora as to throw some doubt on its status as a hybrid, it is here provisionally included as a species under the name *R. frondosus.* No. 1 also is provisionally recognized as a species.

9. **R. frondosus** Bigel. (Including *R. recurvans* Blanchard.)

Hillside pastures, especially about thickets, and around ravines, mostly in gravelly soils; common. June.

Especially abundant about Buttermilk Glen and on the hillside from Renwick to Esty.

N. S. to Pa. and Ohio; rare or absent on the Coastal Plain.
Plants referred to this species are variable and have every appearance of being hybrids between *R. allegheniensis* and *R. flagellaris*; see discussion under the latter species.

10. **R. canadensis** L.

Dry thickets, in light neutral or acid soils; frequent. June.
Ravine s. of Cayuta Lake; Caroline Center, common; Michigan Hollow; Lake Como; Mud Creek, Freeville; border of open bog, McLean Bogs; Townley Swamp; Spring Lake; near Featherbed Bog.
Newf. to Lake Superior, southw. in the uplands to N. C.

11. **R. pergratus** Blanchard.

Thickets, fence rows, and old pastures, mostly in gravelly soils; scarce. June.
Around McLean Bogs; near McKinney Twin Glens; and probably elsewhere.
Me. to Ont., southw. to N. Y. and Iowa; rare or absent on the Coastal Plain.
Appearing like a hybrid of *R. allegheniensis* and *R. flagellaris.*

12. **R. allegheniensis** Porter. (Chiefly *R. villosus* of Cayuga Fl.) COMMON BLACKBERRY.

Dry banks and thickets, in gravel or mixed clay and gravel; common. June.
N. S. to Ont., southw. to Va. and N. C.; frequent on the northern Coastal Plain.
This plant apparently hybridizes freely with other species of blackberry and with the dewberry.

18. **Dalibarda** (Tourn.) L.

1. **D. repens** L.

Low woodlands, in damp humus, in gravelly calcareous soils; frequent. July–Aug.
Mostly about sphagnum swamps and in hemlock woods: Michigan Hollow Swamp (*D.*!); w. of Key Hill; Enfield Glen (*D.*); Fir Tree Swamp, Freeville; w. of Dryden Lake; Mud Creek, Freeville; Malloryville Bog; Beaver Brook; and elsewhere.
N. B. to Minn., southw. to n. N. J., Pa., Ohio, and Mich.; rare or absent on the Coastal Plain.

19. **Agrimonia** (Tourn.) L.

a. Leaves sparsely hirsute or subglabrous beneath; rhachis of the inflorescence glandular-puberulent and hirsute or glabrous; bristles of the fruit 1.5–4 mm. long, spreading.
  b. Mature hypanthium 5–6 mm. in diam., strongly striate; bristles in many rows, the longer bristles 3.5–4 mm. long; petals 4 mm. long; plant stout; root not tuberous; leaf clearly atomiferous beneath. 1. *A. gryposepala*
  b. Mature hypanthium 2.5–2.8 mm. in diam., faintly striate; bristles in 3–4 rows, the longer bristles 1.5–1.8 mm. long; petals 3 mm. long; plant slender; root often tuberous-thickened; leaf obscurely atomiferous beneath. 2. *A. rostellata*
a. Leaves short-pubescent beneath, at least on the veins; rhachis of the inflorescence finely pubescent, rarely somewhat hirsute, the hairs not glandular; bristles of the fruit 2.2 mm. long or less.
  b. Leaves obscurely or not at all atomiferous beneath, very downy; root tuberous; hypanthium 3 mm. long, with an inconspicuous border and somewhat spreading or connivent bristles which are often reddish; stipules reniform, evenly several-toothed; petals 3 mm. long. 3. *A. mollis*
  b. *Leaves plainly atomiferous beneath, downy principally on the veins; root not* tuberous.

c. Principal leaflets 7–9, elliptic; hypanthium 4–5 mm. long, the border obsolete and the bristles connivent; stipules ovate, with an entire point and a few irregular teeth below; petals 3.5 mm. long. 4. *A. striata*

c. Principal leaflets 11–17, lanceolate; hypanthium about 2 mm. long, with a conspicuous border and spreading bristles; stipules reniform, evenly several-toothed; petals 3 mm. long. 5. *A. parviflora*

1. **A. gryposepala** Wallr. (*A. Eupatoria,* in part, of Cayuga Fl.) AGRIMONY.

Dry thickets and banks, in heavy or light soils; common. July–Aug.

N. B., s. N. S., and cent. Me., to Minn. and Calif., southw. to N. C., Tenn., and Mo.; much less common on the Atlantic Coastal Plain.

The foliage of this species, when bruised, has a strong rank odor which is almost or quite absent in *A. striata.*

2. **A. rostellata** Wallr.

Dry scrubby banks, in light soils; rare. July 20–Aug.

N. bank of Big Gully (*K. M. W., A. J. E., & L. F. Randolph*).

Conn. and cent. N. Y. to Nebr., southw. to Ga., Tenn., and Mo.; occasional on the Coastal Plain.

3. **A. mollis** (T. & G.) Britton. SOFT AGRIMONY.

Open alluvial woods and grassy scrubby pastures about ravines; scarce. Aug.–Sept.

Enfield Glen, below the lower falls; Fall Creek, above the second bridge in Forest Home; n. e. corner of Ithaca golf links; fields n. of Upland Road, Cayuga Heights; Salmon Creek, below Genoa; Paine Creek; Big Gully.

Mass. to Mich., southw. to N. C. and Kans.; infrequent on the Coastal Plain.

4. **A. striata** Michx. (*A. Eupatoria,* in part, of Cayuga Fl.) AGRIMONY.

Dry thickets and banks, in gravel and clay but not in acid soils; frequent. Aug.–Sept., flowering much later than *A. gryposepala.*

North Spencer; Dry Run, Spencer; South Hill; Six Mile Creek; Beebe Lake; Etna; near Malloryville Bog; Cortland marl ponds; Salmon Creek valley, in several places; Paine Creek; Waterloo; and elsewhere.

Newf. to Sask., southw. to W. Va., Ill., Nebr., S. Dak., Wyo., and N. Mex.; rare or absent on the Coastal Plain. Found also in Eurasia.

5. **A. parviflora** Ait. SMALL-FLOWERED AGRIMONY.

Marshy places, in somewhat sandy soils; rare. Aug.–Sept.

West Danby, 1882 (*F. C. Curtice,* D.); s. side of Coy Glen, about the marl spring, growing with *Pedicularis lanceolata,* 1903 (*W. W. Rowlee*!); one mile w. of Freeville, 1882 (*D.*).

Conn. to Minn., southw. to Ga., La., and Kans.; occasional on the Coastal Plain.

20. Sanguisorba (Rupp.) L.

a. Leaflets oblong, 2–5 cm. long, serrate; spikes cylindrical, whitish; stamens 4. 1. *S. canadensis*

a. Leaflets ovate-orbicular, 8–15 mm. long, deeply cut; spikes ovoid, greenish purple; stamens many. 2. *S. minor*

1. **S. canadensis** L. (*Poterium canadense* of Cayuga Fl.) CANADIAN BURNET.

Boggy marl meadows; rare. Aug.–Sept.

Marl spring one-half mile s. of mouth of Enfield Glen; Larch Meadow (*D.*!); Mud Creek, Freeville (*D.*!); Lake Como (Locke Pond, *D.*).

Lab. to Man., southw. to Va. and Mich., and in the mts. to Ga.; more frequent along the coast than inland.

2. **S.** MINOR Scop. (*S. officinalis* of Cayuga Fl.) GARDEN BURNET.

Dry gravelly banks; rare, but becoming more frequent. June–July.

Near Triphammer Falls (*F. P. Metcalf*); pasture n. w. of Chicago Springs, abundant, 1920; Paine Creek glen, 1919 (*A. J. E., K. M. W., & L. F. Randolph*); West Shore R. R., e. of Clyde (*D.*).

Me. to w. N. Y. and Md. Adventive from Eurasia.

Dudley states that *S. officinalis* "occurs well established along the West Shore R. R. east of Clyde Sta." A Dudley specimen in the C. U. Herbarium from this station, labeled *S. officinalis*, is *S. minor* Scop.

21. Rosa (Tourn.) L.

a. Styles cohering in a protruded column; leaflets usually 3; stems trailing or climbing. 1. *R. setigera*

a. Styles distinct, not protruded; leaflets 5–7; stems erect.

- *b.* Sepals ascending or connivent after flowering, persistent; pedicels and receptacles naked; leaves dull.
  - *c.* Stems armed with hooked prickles; sepals with a few glands in the tomentum, or glandless; flowers double; leaves pubescent beneath. 2. *R. cinnamomea*
  - *c.* Stems unarmed, sometimes with abundant straight setose prickles; sepals glandular-hispid; flowers single; leaves pubescent or subglabrous beneath; plant lower. 3. *R. blanda*
- *b.* Sepals spreading or reflexed after flowering, deciduous; pedicels and receptacles usually more or less glandular-hispid; leaves glossy or dull, glabrous or pubescent between the veins beneath.
  - *c.* Leaf rhachis strongly glandular-pubescent; leaves apple-scented (at least in no. 4), elliptic-oval, subobtuse, pubescent between the veins beneath; stipules broad.
    - *d.* Leaflets 2 cm. long or less, glandular beneath; flowers 3–4 cm. in diam., single; prickles stout, hooked. 4. *R. Eglanteria*
    - *d.* Leaflets 3–6 cm. long, glandular only on midrib or glandless; flowers 6–8 cm. in diam., usually double; prickles slender and straight, or wanting. 5. *R. gallica*
  - *c.* Leaf rhachis glandless, or rarely with a few glands, glabrous or pubescent; leaves not scented, elliptic, acute, usually glabrous between the veins beneath.
    - *d.* Terminal leaflets with (11) 14–20 fine teeth on each side above the middle; stipules narrow; prickles stout, hooked; flowers 2–many; sepals little if at all lobed; plants of wet soil. 6. *R. palustris*
    - *d.* Terminal leaflets with 9–13 coarser teeth on each side above the middle; flowers 1–3, together; sepals strongly lobed or pinnate; plants of dry soil.
      - *e.* Prickles stout, strongly hooked; canes long and arching; stipules dilated. 7. *R. canina*
      - *e.* Prickles slender, straight; canes low and rather straight; stipules narrow. 8. *R. carolina*

1. **R. setigera** Michx. PRAIRIE ROSE.

Thickets in ravines and along fence rows, in clay or shaly soils; occasional. July.

South Hill, near old railroad embankment and near old reservoir (Morse Chain Works) (*D.*!); Amphitheater, Six Mile Creek (*D.*); Cascadilla Glen, below bridge and above Glen Pond (*D.*); e. of Perry City; field near Utt Point (*D.*).

W. Ont. to Wis., southw. to W. Va., Fla., and Tex.; introduced eastw. Doubtfully native in the Cayuga Lake Basin.

2. **R.** CINNAMOMEA L. CINNAMON ROSE.

Roadsides and fence rows, in heavy soils; frequent. June.

Near Summit Marsh; n. w. of Enfield Falls; South Hill; E. State St., Ithaca; Dwyer Pond; near Ringwood; Etna; Freeville; and elsewhere.

Formerly cultivated, and now escaped in the Eastern States. Native of Eurasia.
According to Rydberg (N. A. Flora **22**: 514. 1918), the proper name for this species is *R. spinosissima* L.

3. **R. blanda** Ait.

Rocky or gravelly banks, in calcareous soils; locally abundant. June, rarely to July 10.
Abundant on the lake cliffs; rarely elsewhere, as hilltop at Ithaca-Newfield town line, s. of Coy Glen, hedgerow w. of C. U. barns, and Taughannock Falls.
Newf., Vt., and Ont., to Alberta, southw. to n. N. J., N. Y., and Mo.
Hybrids of this species with others are occasional.

4. **R.** EGLANTERIA L. (See Bailey, Man. Cult. Pl., p. 346. 1924. *R. rubiginosa* L.) SWEETBRIER.

Hillside pastures, in clayey or gravelly nonacid soils; frequent. July.
N. w. of Enfield Falls; n. of Coy Glen; South Hill; West Hill; near Glenwood; near Besemer; e. of Etna; McLean; and elsewhere.
N. S. to Ont., southw. to Va., Tenn., and Kans. Naturalized from Eurasia.
Hybrids of this and *R. carolina* L. (*R. humilis* Marsh.) are frequent.

5. **R.** GALLICA L.

Roadsides, in gravelly neutral or acid soils; scarce. June 15–July 15.
Escaped from cultivation and now established: Spencer, in several places; near Michigan Hollow Swamp; Tyre.
N. E. to Ohio. Naturalized from Eu.
The striped form, var. *versicolor* Thory, occurs along the road w. of Danby village.

6. **R. palustris** Marsh. (See Rhodora **20**: 91. 1918. *R. carolina* of authors and of Cayuga Fl.)

Swamps containing either limy or acid waters; common. July 10–Aug. 15.
N. S. to Minn., southw. to Fla., Miss., and Mo.; common along the coast.

7. **R.** CANINA L. DOG ROSE.

Dry grassy roadsides and pastures, in mixed soils of clay and sand or gravel; rare.
Roadside near Buttermilk Falls (*D.* in C. U. Herb.); s. side of Six Mile Creek, ¼ mile above pumping station (*D.* in C. U. Herb.); Esty Glen; n. of Big Gully; Union Springs.
Escaped from cultivation. Native of Eurasia.

[**R. virginiana** Mill. (*R. lucida* Ehrh.? and of Cayuga Fl.)

Plants from n. of Eddy Pond, and from near the Junius ponds, are referred by Dudley to this species. True *R. virginiana* is a plant of the coastal region and apparently does not occur in New York State except in the vicinity of New York City. A specimen from Dudley in the Gray Herbarium, labeled by him "*R. humilis*: Old fruiting stem very prickly, near Casc. Cr. Ithaca, Oct. 1885," bears in Watson's handwriting the correction "*R. lucida*," and is apparently a hybrid of *R. carolina* and *R. Eglanteria*. It was probably on this specimen and Watson's correction that Dudley inserted *R. lucida* in the *Cayuga Flora*.]

8. **R. carolina** L. (See Rhodora 20: 91. 1918. *R. humilis* of authors and of Cayuga Fl.) DWARF ROSE.

Borders of dry thickets and hedgerows, also by roadsides, in mixed clayey and sandy or gravelly soils; common. June 20–July.

Especially abundant on South Hill, and along the lake slopes from Cayuga Heights northw.; mostly absent on the chestnut soils and on the McLean gravels (?).
Newf. to Minn., southw. to Fla., Okla., and La., including the Coastal Plain.
The leaves are not so dull as several textbooks represent them to be, but are very lustrous, at least when mature.
Plants apparently of hybrid origin between this species and *R. Eglanteria* are common. They show various combinations of leaf form, glandularity, and shape of prickles.

22. **Prunus** (Tourn.) L.

a. Flowers subsessile, large, pink; drupe downy; stone sculptured; leaves conduplicate. 1. *P. Persica*
a. Flowers pedicelled, large or small, white; drupe glabrous; stone not sculptured; leaves conduplicate or convolute.
  b. Flowers umbellate, rarely subcorymbose or solitary, not from leaf-bearing buds (except in no. 7).
    c. Leaves convolute; fruit large except in no. 5a, 2–4 cm. long, sulcate; stone flattened; twigs in winter usually not terminated by a bud. (Plums.)
      d. Leaves acuminate, glabrous or nearly so when mature; fruit reddish yellow.
        e. Sepals very broad and obtuse, subglabrous, not serrate nor red; leaves small, the blade 3–5 cm. long, crenate-serrate, the petiole 5–14 mm. long; petiolar glands nearly or quite wanting. 2. *P. cerasifera*
        e. Sepals ovate-lanceolate; calyx and stamens often purplish; leaves large, the blade 5–8 cm. long, the petiole 7–15 mm. long; petiolar glands strongly developed.
          f. Sepals entire, tomentose within; leaves sharply serrate. 3. *P. americana*
          f. Sepals glandular-serrate, glabrous; leaves with crenate gland-tipped teeth. 4. *P. nigra*
      d. Leaves obtuse or acutish, downy beneath; calyx and stamens not purplish; fruit blue-black.
        e. Blade 5 cm. long or more; flowers 2–2.5 cm. in diam.; fruit 3–4 cm. long. 5. *P. domestica*
        e. Blade 2.5–4 cm. long; flowers 0.8–1.5 cm. in diam.; fruit 1.2–2 cm. long. 5a. *P. d.*, var. *insititia*
    c. Leaves conduplicate; fruit smaller (2 cm. long or less), not sulcate; stone subglobose; twigs in winter with a terminal bud. (Cherries.)
      d. Plant dwarf, 1.5 m. high or less; leaves spatulate-oblong, pale beneath, with low sharp distant teeth. 6. *P. susquehanae*
      d. Plant arborescent; leaves lanceolate or obovate, simply or doubly crenate.
        e. Flowers 2–3 cm. in diam., umbellate; fruit 15–20 mm. in diam; leaves oblong-obovate, abruptly short-acuminate, coarsely doubly crenate-dentate; bark of branches dull dark ashy-brown.
          f. Leaves firm, waxy, glabrous or nearly so from the first; veins 6–8 pairs; flower spurs leafy; flower-bud scales scarcely enlarging, erect, 3–8 mm. long or less; sepals crenate; fruit sour. 7. *P. cerasus*
          f. Leaves thin, veiny, hairy when young; veins 10–14 pairs; flower spurs leafless; flower-bud scales enlarging, recurved, 10–15 mm. long; sepals entire; fruit sweet. 8. *P. avium*
        e. Flowers 1.5 cm. in diam. or less, often subcorymbose; fruit 7–8 mm. in diam.; leaves oblong-lanceolate, gradually pointed, very finely and unequally crenate-dentate; bark of branches reddish bronze. 9. *P. pennsylvanica*

b. Flowers racemose, the peduncles usually leafy.
c. Flowers 10–15, in short racemes; sepals oblong, entire, 1.7–2 mm. long; leaf blade small, 3–5 cm. long, suborbicular, apiculate, crenulate. 10. *P. Mahaleb*
c. Flowers (15) 20–30, in long racemes; sepals smaller and glandular-serrate or nearly obsolete; leaf blade larger, elliptical or obovate.
d. Leaves thin, mostly obovate, sharply serrate; sepals suborbicular, plainly glandular-serrate; fruit strongly astringent; odor of bark somewhat mephitic. 11. *P. virginiana*
d. Leaves thick, waxy, elliptical or lanceolate, crenate-serrate; sepals almost obsolete, obscurely glandular; fruit bitter but scarcely astringent; odor of bark like that of bitter almonds. 12. *P. serotina*

1. **P.** PERSICA (L.) Stokes. PEACH.

Cultivated, and occasionally escaping to roadsides. Apr. 20–May 20.
Native of Asia.

2. **P.** CERASIFERA Ehrh. CHERRY PLUM. MYROBALAN PLUM.

Roadsides and thickets; occasional. Apr. 20–May 15.
Slope s. of McKinneys; near Big Gully; and elsewhere.
Native of Eu. In this country escaped from cultivation where it is used as a stock on which other plums are grafted.

3. **P. americana** Marsh. (*P. americana,* second form, of Cayuga Fl.) WILD PLUM.

Thickets and fence rows where not too dry, and along streams, in clays or alluvium; frequent. May 10–25.
Newfield; mouth of Enfield Glen; Coy Glen; E. State St.; Ellis Hollow; Renwick slope; Shurger Glen; near Ludlowville; s. of Union Springs; and elsewhere.
Conn. to Mont., southw. to Fla., Tex., and Colo.; infrequent on the Coastal Plain.

4. **P. nigra** Ait. (*P. americana,* first form, of Cayuga Fl.) WILD PLUM.

In situations similar to the preceding; somewhat more frequent than *P. americana.* May 5–20.
Enfield Glen; near South Hill Marsh; Six Mile Creek, near E. State St.; C. U. campus, near Barnes Hall; near McGowan Woods; Renwick slope; rocky crests of Shurger Glen; n. of Levanna; and elsewhere.
Newf. to Wis. and Alberta, southw. to Conn., and in the mts. to Ga.; rare or absent on the Coastal Plain.

5. **P.** DOMESTICA L. GARDEN PLUM.

Occasionally escaping from cultivation to roadsides. May.
N. w. of North Spencer; South Hill (*D.*); "Cornell's Woods" (*D.*); near Forest Home; n. of Cayuga Heights; s. of McKinneys; Ledyard; and elsewhere.
Native of Eurasia.

5a. **P.** DOMESTICA L., var. INSITITIA (L.) Bailey.

By roadsides; occasional. May.
On hill n. of Enfield Falls; Cayuga Heights; gully on hill above Portland Point; forming thickets along shore on Farley Point; and elsewhere.
Native of Eurasia.
Bailey (Stand. Cyclop. Hort., vol. 5) says: "When the plum runs wild, it usually reverts to this form." Hedrick (*Plums of New York,* p. 35) disagrees with this opinion, and considers *P. insititia* a valid species. However, the latter plant differs from *P. domestica* only in the smaller size of leaves, flowers, and fruits, and in its more stunted habit. It should be considered, therefore, a variety rather than a species. *P. spinosa* of the *Cayuga Flora* was probably a mistaken identification of this same plant. Dudley's station, however, is now destroyed.

6. **P. susquehanae** Willd. (See Rhodora 25: 73. 1923. *P. pumila* of Cayuga Fl. *P. cuneata* Raf. and of recent authors.) DWARF CHERRY.

Low sandy, gravelly, or loamy fields and banks, in acid soils; rare. May 10–June 1.

South Hill Marsh, the only station, 1882 (*F. C. Curtice, D.*!). Reported elsewhere in N. Y. State from L. I., Albany, Ausable Point, and Penfield.

S. Me. to Minn., southw. to N. C.; rare or absent on the Coastal Plain.

7. **P.** CERASUS L. SOUR CHERRY.

Frequently escaping from cultivation to roadsides. May.

Danby; n. of Enfield Glen; road to Buttermilk Falls; Turkey Hill; Forest Home; Renwick slope (*D.*); near Ludlowville; and elsewhere.

Native of s. Eu.

8. **P.** AVIUM L. SWEET CHERRY.

Escaping from cultivation like the last preceding species, but much more common and well established, chiefly in the heavier soils. May.

Hedgerows, South Hill, abundant; West Hill, in Enfield, Newfield, and Ithaca; Turkey Hill; and elsewhere; "all ravines near Ithaca, . . . where it forms small thickets and groves on the cleared banks" (*D.*). These wild forms seem to be mostly of the type with heart-shaped, almost black, fruit, and very succulent flesh, and are probably the Black Tartarian variety. Red-fruited trees occur rarely, as on South Hill and n. of Coy Glen. These have the appearance of being a color variation from the dark-fruited form.

Native of Eurasia.

9. **P. pennsylvanica** L. f. PIN, PIGEON, OR WILD RED CHERRY.

Thickets, clearings, and ravines, in gravelly soils; common. May 10–25.

Most abundant in the McLean region; frequent elsewhere.

Lab. to B. C., southw. to Pa., the Great Lakes, Iowa, and in the mts. to N. C. and Colo.; frequent on the northern Atlantic Coastal Plain.

10. **P.** MAHALEB L. MAHALEB OR ST. LUCIE CHERRY.

Roadsides and thickets, in gravelly soil; rare. May 20–June 10.

Roadside, South Ave., Ithaca (*F. P. Metcalf*); Taughannock Point; Cayuga Lake shore, s. of Union Springs.

Native of Eu. Used for cherry stock and occasionally spontaneous.

11. **P. virginiana** L. CHOKE CHERRY.

Rocky banks, hedgerows, and thickets, in rather heavy dry soils, apparently with little relation to lime content; common, and generally distributed. May 5–30.

Newf. to S. Dak., southw. to Fla., Kans., and Tex.; rare on the Coastal Plain.

Authors differ widely as to the application of the Linnean name *P. virginiana*, and the matter is not yet clearly settled.

12. **P. serotina** Ehrh. WILD BLACK CHERRY. TIMBER CHERRY.

Dry woods and thickets, in sandy, gravelly, or stony soil with little regard to lime content; common. May 20–June 10 (about two weeks later than the last preceding species).

N. S. to N. Dak., southw. to Fla. and Ariz., including the Coastal Plain.

66. LEGUMINOSAE (PULSE FAMILY)

ARTIFICIAL KEY TO THE GENERA

a. Corolla not papilionaceous.
  b. Flowers small, whitish or greenish; trees.
    c. Calyx elongated; stamens 10; leaflets ovate, acute. 1. GYMNOCLADUS

c. Calyx short; stamens 3–6; leaflets small, elliptic-ovate, obtuse. 2. GLEDITSIA
b. Flowers more showy, yellow; herbs. 3. CASSIA
a. Corolla papilionaceous; stamens 10.
b. Stamens separate; herbs, with 3-foliolate leaves. 4. BAPTISIA
b. Stamens monadelphous or diadelphous.
c. Stamens monadelphous; anthers of two forms, 5 each; leaves palmately 7–11-foliolate. 5. LUPINUS
c. Stamens diadelphous, 9 and 1; anthers similar; leaves 3-foliolate or pinnate.
d. Leaves 3-foliolate.
e. Leaflets serrulate; pods 1–6-seeded, indehiscent or tardily dehiscent, very small.
f. Pods straight.
g. Flowers capitate; stamens adhering to the corolla. 6. TRIFOLIUM
g. Flowers in spikes; stamens free from the corolla. 7. MELILOTUS
f. Pods curved or coiled; flowers in spikes or heads; stamens free from the corolla. 8. MEDICAGO
e. Leaflets entire.
f. Plants not twining; pods of 1–several 1-seeded joints, indehiscent; flowers purplish; stipules very small.
g. Pods 1-seeded, not uncinate-pubescent; leaflets not stipellate. 15. LESPEDEZA
g. Pods 2–several-seeded, 2–several-jointed, uncinate-pubescent; leaflets stipellate. 14. DESMODIUM
f. Plants not twining; pods not jointed, dehiscent; flowers yellow; stipules as large as the leaflets (see also 3d *f*). 9. LOTUS
f. Plants twining; pods not jointed, dehiscent; flowers white or purplish; stipules small. 19. AMPHICARPA
d. Leaves pinnate.
e. Leaves odd-pinnate; tendrils wanting.
f. Plant twining. 18. APIOS
f. Plant not twining.
g. Pods short, tardily dehiscent, 1–2-seeded; flowers spicate, small, purple; shrubs; (foliage glandular-dotted). [AMORPHA]
g. Pods composed of 3–7 4-angled, indehiscent joints; flowers umbellate, purple; herbs. 13. CORONILLA
g. Pods not jointed, dehiscent; flowers not umbellate; herbs or trees.
h. Standard broad.
i. Wings coherent with the keel; herbs. 10. TEPHROSIA
i. Wings free; trees. 11. ROBINIA
h. Standard narrow; herbs with inflated pods. 12. ASTRAGALUS
e. Leaves abruptly pinnate; rhachis usually tendril-bearing.
f. Wings and keel adherent; style filiform, bearded at the apex only. 16. VICIA
f. Wings usually free; style flat, bearded down the inner face. 17. LATHYRUS

1. Gymnocladus Lam.

1. **G. dioica** (L.) Koch. (*G. canadensis* Lam.) KENTUCKY COFFEE TREE.

Rich gravelly bottom-land soil; rare. May 25–June 10.

"At the bottom of a ravine near the borders of Cayuga L." (*Dr. Alex. Thompson* in Torrey's Fl. of N. Y.; also in Dr. Thompson's Cat. of 1841); "it is quite likely the precise locality was Lockwoods Flats at the mouth of Big Gully, where Professor Thomas of Union Springs remembers to have seen it many years ago" (*D.*); "Ithaca" (in Herb. Van Duzer, see Paine's Cat.). Three trees in the town of Lansing, near Cayuga Lake at McKinneys (*H. B. Lord* in 19th Regents Rept.,

1865, p. 77). "Three middle-size trees near the brook at Lake Ridge Sta.!" (*D.*). "Three rather large trees apparently indigenous near the Lehigh Valley R. R. round-house at Ithaca!" (*D.*). The above records are from Dudley's *Cayuga Flora.* One very small tree now remains at McKinneys, and one or two at the roundhouse station. Several large trees are planted in a row on Humboldt St., Ithaca.

Cent. N. Y. and Pa. to Minn., southw. to Tenn., Okla., and Nebr. A tree of the Ohio and Mississippi Valleys.

2. Gleditsia L.

a. Pods linear, 20–45 cm. long, many-seeded; leaflets 15–30 mm. long; thorns usually branched. 1. *G. triacanthos*

a. Pods oval, 3–4 cm. long, 1-seeded; leaflets larger, more crenate; thorns usually simple. [*G. aquatica*]

1. **G. TRIACANTHOS** L. HONEY LOCUST.

Hillsides and stream banks, in rather heavy or rich soils; occasional. June 5–25.

South Hill (*D.!*); road to Buttermilk Glen; road to Coy Glen; Six Mile Creek (*D.*); East Hill (*D.!*); near Esty; and elsewhere.

W. N. Y. and Pa. to S. Dak., southw. to Ga., Kans., and Tex. A plant of the rich lands of the Mississippi Valley; planted in the East, and occasionally spontaneous.

[**G. AQUATICA** Marsh. (*Gleditschia monosperma* of Cayuga Fl.) WATER LOCUST.

"A single young tree growing spontaneously, by one of the roads south of the steamboat landing" (*D.*); not seen in recent years.

Native of deep swamps: S. C. to Fla. and Tex., northw. in the Mississippi Valley to Ky., Ind., Ill., and Mo.]

3. Cassia (Tourn.) L.

1. **C. marilandica** L. WILD SENNA.

Moist sandy or alluvial soils; rare. July 15–Aug. 15.

"Roadside near the fork of the Slaterville and Brookton roads, e. of Ithaca" (*D.*); near the C. U. barns (*Miss I. Dobroscky*); along road and in field 1½ miles s. w. of Spring Lake (*L. F. Randolph, A. J. E., & K. M. W.*). Appearing as though adventive.

Mass. to Ohio, southw. to Fla. and Tenn.; less frequent on the Coastal Plain.

4. Baptisia Vent.

1. **B. tinctoria** (L.) R. Br. WILD INDIGO.

Junius (*Sartwell*); not seen in recent years.

S. N. H. to Minn., southw. to Fla. and Ky.; common on the Coastal Plain.

5. Lupinus (Tourn.) L.

1. **L. perennis** L. WILD LUPINE.

Dry sandy acid soils, chiefly with ericaceous plants and chestnut; frequent. May 10–June 10.

On the hills w., s., and s. e. of Ithaca, on the ravine crests and the cliffs along Cayuga Lake, and in the sandy soils n. of the lake: hills of Newfield, Danby, and Caroline (*D.*); hill, e. side of valley s. of Mecklenburg, abundant; nearly all the ravines of the basin (*D.*); hillsides near Coy Glen and Buttermilk Glen; Cascadilla woods, near Old Armory (*D.*); lake slope above Renwick; Junius (*Sartwell!*); absent in the McLean region and on the clays and richer soils back from the lake shores.

Me. to Minn., southw. to Fla. and La.; most common on the Coastal Plain.

6. Trifolium (Tourn.) L.

a. Flowers sessile; heads dense; corolla pink or purple.
b. Stems closely creeping and rooting; calyx much inflated in fruit; corolla rose-pink. 1. *T. fragiferum*
b. Stems erect or ascending, not rooting at the nodes; calyx not inflated in fruit or only slightly so.
c. Calyx teeth plumose, longer than the pale pink corolla. 2. *T. arvense*
c. Calyx teeth villous or glabrate, shorter than the pinkish purple corolla. 3. *T. pratense*
a. Flowers pedicelled; heads looser.
b. Corolla white or purple.
c. Stems closely creeping and rooting, the peduncles arising from the ground; heads white. 4. *T. repens*
c. Stems erect or ascending, not rooting at the nodes; leaves larger; heads mostly purple-tinged. 5. *T. hybridum*
b. Corolla yellow.
c. Terminal leaflet sessile; plant erect; heads many-flowered; corolla striate. 6. *T. agrarium*
c. Terminal leaflet stalked; plant diffuse and weak.
d. Heads many-flowered; corolla striate. 7. *T. procumbens*
d. Heads 5–12-flowered; corolla scarcely striate; plant very slender. 8. *T. dubium*

1. **T.** FRAGIFERUM L. STRAWBERRY CLOVER.

A well-established weed in the lawn near Roberts Hall, C. U. campus, 1923. Apparently not reported from elsewhere in the U. S. Adventive from Eu.

2. **T.** ARVENSE L. RABBIT-FOOT CLOVER.

Fields and roadsides, in dry acid sandy soils; rare. Aug. 15–Sept. 15.

Field, top of hill s. of upper Buttermilk reservoir, 1916 (*K. M. W. & F. P. Metcalf*); grassy knoll, Highland Ave. near Upland Road, Cayuga Heights, 1915–1916; w. of Lowery Ponds.

Que. and Ont. to Mo., southw. to Fla. and Tenn.; common along the coast. Naturalized from Eurasia.

3. **T.** PRATENSE L. RED CLOVER.

Fields and roadsides, in rich soils; common, but less so than formerly. June–Oct. Cultivated, and extensively escaped.

Widely naturalized in N. A. Native of Eurasia.

[**T.** INCARNATUM L.

Has been found a few times as a temporary escape from cultivation.]

4. **T.** REPENS L. CREEPING WHITE CLOVER.

Lawns and roadsides, in rich soil; very common. June–Oct.

Common in cultivation, and extensively escaped.

Widely naturalized in N. A. Native of Eurasia.

5. **T.** HYBRIDUM L. ALSIKE CLOVER.

Fields and roadsides, in rich heavy soil; very common. June–Aug.

Common in cultivation, and extensively escaped. First noted as an escape at McLean and Ithaca in 1878 (*D.*).

Widely naturalized in N. A. Native of Eu.

6. **T.** AGRARIUM L. YELLOW OR HOP CLOVER.

Fields and roadsides, in dry gravelly, mostly neutral or acid, soils; frequent and widely distributed in the proper soils. June–Aug.

Newf. to w. Ont. and Iowa, southw. to Ga.; common along the coast. Naturalized from Eu.

7. **T.** PROCUMBENS L. LOW HOP CLOVER.

In situations similar to the preceding, more often in pastures, lawns, or other places where the grass is short; scarce. July–Aug.

C. U. campus, 1882 (*D.*), also 1914; cemetery, University Ave. (*D.*!); pasture n. of Glen Pond (*D.*); end of footbridge, Cornell Heights; Cayuga Heights; near Taughannock Gorge; Howland Point.

N. S. to Wash., southw. to Ga. and Miss. Naturalized from Eu.

8. **T.** DUBIUM Sibth. LITTLE HOP CLOVER.

Dry gravelly or sandy fields and roadsides; rare. June–July.

Lawn, Roberts Hall, C. U. campus, 1925; e. side of Highland Ave., s. of Pleasant Grove Brook (a large patch in 1914 but now probably exterminated by building operations) and n. of same brook, 1923; near Taughannock Hotel, 1907; lawn at Interlaken, 1923.

Mass. to Va. and Tenn., and locally to Ga., Ark., and Miss. Naturalized from Eu.

7. Melilotus (Tourn.) Mill.

a. Legume reticulate-alveolate or almost smooth.
  b. Wings shorter than the standard, equaling the keel; flowers white, 3–5 mm long, not fragrant; fruit glabrous, 2.3–3.5 mm. long, oval, mostly obtuse, the upper suture not carinate; seeds orbicular, smooth, scarcely or not at all emarginate. 1. *M. alba*
  b. Wings and standard equal, often longer than the keel; flowers yellow, 5–6 mm long, fragrant; fruit strigose, 4.5–5.5 mm. long, ovate-oval, acuminate gibbous, the upper suture carinate; seeds oval, punctate, emarginate. 2. *M. altissima*
a. Legume with strong transverse ridges, only slightly netted, glabrous, 2.5–3.5 mm long, ellipsoid-oval, mucronulate, the upper suture not carinate; seeds ovoid smooth, not emarginate; flowers yellow, 5–6 mm. long; wings shorter than the standard but longer than the keel. 3. *M. officinalis*

1. **M.** ALBA Desr. WHITE SWEET CLOVER. WHITE MELILOT.

A weed on dry gravelly roadsides, in waste places, on the gravel bars of stream and lake shores, and on shale talus, rarely on clay soils; very common. June–Oct

Widely naturalized in N. A. Native of Eurasia.

2. **M.** ALTISSIMA Thuill. (*M. officinalis,* chiefly, of Cayuga Fl.) YELLOW SWEET CLOVER. YELLOW MELILOT.

A weed in heavy soils; becoming common. June–Oct.

Near athletic field, C. U. campus; n. side of Beebe Lake; Cayuga Heights Road abundant; railroad embankment e. of McLean; and elsewhere.

Naturalized about the eastern seaports and occasionally inland. Native of Eu.

3. **M.** OFFICINALIS (L.) Lam. (*M. officinalis,* in part, of Cayuga Fl.) YELLOW SWEET CLOVER. YELLOW MELILOT.

A weed in fields and by roadsides, in rich soil; apparently rare. June–July.

S. of athletic field, C. U. campus, 1913 (*E. L. Palmer*); Renwick, 1920 (*A. R. Bechtel & W. C. Muenscher*).

Widely naturalized in N. A. Native of Eurasia.

8. **Medicago** (Tourn.) L.

a. Flowers blue-purple; pods spirally twisted; plant mostly erect. 1. *M. sativa*
a. Flowers yellow; pods coiled; plant mostly prostrate. 2. *M. lupulina*

1. **M.** SATIVA L. ALFALFA. LUCERNE.

A weed in fields and by roadsides, in rich soil; frequent. June–July.
Commonly cultivated, and frequently escaped.
Widely introduced in N. A. Native of Eu.

2. **M.** LUPULINA L. BLACK MEDICK. NONESUCH.

A weed of fields, roadsides, lawns, and cultivated grounds; very common. May–Sept.
Widely naturalized in N. A. Native of Eurasia.
When not in fruit, this plant is often mistaken for *Trifolium procumbens* or *T. dubium*, but it has dentate stipules and much smaller flowers (2 mm. long) in denser heads, and the peduncles are much longer than the leaves.

9. **Lotus** (Tourn.) L.

1. **L.** CORNICULATUS L. BIRD-FOOT TREFOIL.

"Appeared in the turf on the Fiske-McGraw [Chi Psi] grounds, in bloom Aug. 1885" (*D.*); near the greenhouses of the Agricultural College, 1921 (*S. H. Burnham*), and for several years after.
N. S. to D. C. Adventive from Eurasia.

[**Amorpha** L.]

[**A.** FRUTICOSA L. FALSE INDIGO.

An occasional escape from cultivation to roadsides, but apparently not established. Native of s. and w. U. S.]

10. **Tephrosia** Pers.

1. **T. virginiana** (L.) Pers. CATGUT. HOARY PEA.

Open woods and banks, in dry sandy noncalcareous soils; rare. July.
Dry sandy soil, Junius (*Sartwell*!).
S. N. H. to Minn., southw. to Fla., La., Ark., and Mex., particularly on the Atlantic Coastal Plain.

11. **Robinia** L.

a. Branchlets and petioles viscid; racemes crowded. [*R. viscosa*]
a. Branchlets and petioles not viscid; racemes loose. 1. *R. Pseudo-Acacia*

[**R.** VISCOSA Vent. CLAMMY LOCUST.

"Escaped; at Aurora, a few shrubs near the R. R. track" (*D.*!); but possibly planted.]

1. **R.** PSEUDO-ACACIA L. COMMON OR BLACK LOCUST.

Escaped from cultivation and established in ravines and on hillsides, in the richer, moderately dry soils; frequent. June 1–15.
Native from Pa. to Ga. along the mts., and in the Ozark Mts.

12. **Astragalus** (Tourn.) L.

a. Racemes dense; flowers 1.5 cm. long; calyx white-hairy; leaflets 3–5 cm. long, narrowly ovate, blunt; pods imperfectly 2-celled. 1. *A. canadensis*
a. Racemes looser- and fewer-flowered; flowers 1.2 cm. long; calyx dark-hairy; leaflets 2 cm. long, oblong or oblanceolate, blunt or retuse; pod 1-celled. 2. *A. neglectus*

1. **A. canadensis** L. (*A. carolinianus* L.) MILK VETCH.

Damp gravelly, more or less calcareous, soils; infrequent. July 15–Aug. 15.

S. w. corner of Cayuga Lake, toward Glenwood (*D.!*); Taughannock Point; Crowbar Point (*D.*); n. of Esty Glen; Myers Point; n. of Lake Ridge; s. of Willets; "occasional on both shores as far as Cayuga Bridge" (*D.*).

W. Que. and Lake Champlain to Hudson Bay and Sask., southw. to Ga., La., Nebr., and Utah; rare or absent in granitic N. E. and on the Coastal Plain.

A. canadensis L. and *A. carolinianus* L. were apparently first united by Torrey and Gray, under the former name.

2. **A. neglectus** (T. & G.) Sheldon. (*A. Cooperi* of Cayuga Fl.)

Rocky lake banks, in calcareous regions, in shale talus or talus mixed with gravel; rare. June 20–July 15.

S. of Portland Point (Shurger Glen, *D.!*); n. of Portland Point; n. of Ludlowville (*D.*); n. of Lake Ridge; n. of Atwaters; s. of Willets; s. of Levanna (*D.!*).

Que. (?), Ont., and w. N. Y., to Minn. and Iowa; absent on the coast.

13. Coronilla L.

1. **C.** VARIA L.

Grassy roadsides, in gravelly or sandy soil, the lime content of which is unknown; occasional. Aug.

North Spencer village; opposite the church, Asbury (*A. Gershoy*); Salmon Creek, at the crossroads s. of Genoa; one mile n. of Genoa (*R. S. Nanz*). Of recent introduction.

N. E. to N. Y. and N. J. Adventive from Eu.

14. Desmodium Desv.[24]

a. Joints of the loment straight or concave on the back, loment very long-stalked; stamens monadelphous below; peduncles very long and leafless; leaves clustered.

b. Leaves and flowers on separate stems; leaflets ovate, barely acute. 1. *D. nudiflorum*

b. Leaves clustered below the middle of the flowering stem; leaflets orbicular strongly acuminate. 2. *D. grandiflorum*

a. Joints of the loment more or less convex on the back; stalk not more than twice the length of the calyx; stamens usually diadelphous; peduncles not conspicuously elongated; leaves scattered.

b. Plant trailing, soft-hairy; peduncles axillary and terminal; leaflets orbicular. obtuse. 3. *D. rotundifolium*

b. Plant erect, glabrous or hairy; racemes panicled; leaflets narrower.

c. Stipules and bracts large and conspicuous (1–1.5 cm. long); leaves ovate acuminate; stem glabrous except in the panicle. 4. *D. bracteosum*

c. Stipules smaller, inconspicuous.

d. Stalk of the loment equaling or exceeding the calyx; joints very unequal-sided.

e. Leaflets ovate, pubescent especially beneath; stems granular-puberulent and often pilose. 5. *D. Dillenii*

e. Leaflets oblong-lanceolate to linear-lanceolate, slightly strigose; stems glabrous. 6. *D. paniculatum*

d. Stalk of the loment very short or wanting; joints more equal-sided.

e. Plants stiff, tall and stout, more or less villous; bracts conspicuous before flowering; inflorescence dense; flowers showy; leaflets 35–70 mm. long, the lateral ones longer than the petiole. 7. *D. canadense*

e. Plants more diffuse and slender, glabrous or nearly so; bracts inconspicuous; inflorescence more open; flowers inconspicuous; leaflets 7–25 mm. long, the lateral ones shorter than the petiole. 8. *D. marilandicum*

[24] Commonly called Tick Trefoil.

1. **D. nudiflorum** (L.) DC.

Dry open sandy or gravelly woods, in acid soils; frequent. July 20–Aug.

On the hills w., s., and s. e. of Ithaca, on the ravine crests, and probably in the sandy soils n. of Cayuga Lake: Thatcher Pinnacles; Key Hill; s. w. corner of Cayuga Lake; Cascadilla woods; Beebe Lake; above Forest Home; and elsewhere. Absent in the McLean district and on the clays and richer soils back from the lake shores.

Me. to Minn., southw. to Fla., La., and Ark., including the Coastal Plain.

2. **D. grandiflorum** (Walt.) DC. (*D. acuminatum* of Cayuga Fl.)

Rather dry open woods, in rich gravelly and clayey, neutral or somewhat calcareous, soils; more frequent than the preceding. July 1–Aug. 15.

Mostly wanting in the chestnut and ericaceous forests of the higher hills of the basin; frequent in the outwash and delta gravels: upper Six Mile Creek; Cascadilla woods; Beebe Lake; Mud Creek, Freeville; s. of Glenwood; Shurger Glen; and elsewhere.

Me. to S. Dak., southw. to Fla., Ala., Kans., and Okla.; less common on the Coastal Plain.

3. **D. rotundifolium** (Michx.) DC.

Dry sandy or gravelly exposed banks and borders of woods, in noncalcareous soils; scarce. Aug.

Distribution similar to that of *D. nudiflorum*: White Church (*D.*); Thatcher Pinnacles (*D.*); s. side of Coy Glen; s. w. corner of Cayuga Lake; Cascadilla woods; Fall Creek; Turkey Hill; Junius (*Sartwell, D.!*); Duck Lake; and elsewhere.

E. Mass. to Minn., southw. to Fla., La., and Mo., including the Coastal Plain.

4. **D. bracteosum** (Michx.) DC. (*D. cuspidatum* of Cayuga Fl.)

Borders of dry woods, in rich sandy noncalcareous loams; infrequent. Aug.

White Church; Enfield Glen; Coy Glen; s. w. corner of Cayuga Lake; Cascadilla woods (*D.*); Fall Creek, above Forest Home; Paine Creek; and elsewhere.

S. Me. (?) and N. H. to Minn., southw. to Fla., Mo., and Tex.; rare on the Coastal Plain.

5. **D. Dillenii** Darl.

Ravines and dry woodlands, in sandy or gravelly noncalcareous soils; frequent. Aug.

Distribution similar to that of *D. nudiflorum*, but occurring usually in less sterile soil: Enfield Glen; Cayuga Heights; Beebe Lake; e. of Forest Home; and elsewhere.

Cent. Me. to Minn., southw. to Ala., Tenn., and Mo.; less frequent on the Coastal Plain.

This species hybridizes freely with *D. canadense*. The hybrids usually have leaves more like those of *D. canadense*, and the pubescence of the stem is villous rather than granular-scabrous. The joints of the loment in the hybrid are also less unequal-sided.

6. **D. paniculatum** (L.) DC.

Dry open sandy woodlands, in noncalcareous soils; frequent. Aug. 10–30.

Distribution similar to that of *D. nudiflorum*: Enfield Glen; Coy Glen; woods s. and w. of Glenwood; Beebe Lake; and elsewhere.

S. Me. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

7. **D. canadense** (L.) DC.

Open moist gravelly banks, in neutral or somewhat calcareous soils; common. Aug.–Sept.

Especially abundant throughout the basin on railroad embankments, gravelly lake shores, and gravelly bars in streams; elsewhere rare or absent.

N. B. to Man., southw. to N. C., Okla., and Nebr.; less frequent on the Coastal Plain.

[**D. rigidum** (Ell.) DC.

Reported by Dudley with the following stations and comments: "Near ravine north of Enfield ravine. Near White Church. A form (possibly a hybrid *D. rigidum DC.* × *D. Marilandicum, Boott,*) with smoothish stem and leaves 3–4 cm. long, nearly smooth, occurs at White Church." Two specimens sent by Dudley to Watson, and now in the Gray Herbarium, are *D. Dillenii,* with small leaves but otherwise typical of that species; one bears the label "White Church, 1885, no. 27 b", the other "Near Enfield Falls, 1881, no. 27 a". *D. rigidum* is a plant of the Coastal Plain and around the Great Lakes westward, and probably does not occur in central New York.]

8. **D. marilandicum** (L.) DC.

Open dry thickets, in sandy or gravelly noncalcareous soils; rare. Aug.

Near White Church (*D.*); Coy Glen (*D.*!); 1½ miles s. of Pout Pond, abundant (*K. M. W., A. J. E., & L. F. Randolph*).

Mass. to Minn., southw. to Fla., La., and Mo., including the Coastal Plain.

Dudley lists var. *β*, T. & G., with larger leaflets, from Fall Creek mill pond and from near White Church. Hybrids of *D. marilandicum* with some hairy species occur at Coy Glen.

15. **Lespedeza** Michx.

a. Flowers of two kinds, petaliferous and apetalous, in irregular loose clusters, the former violet with a dark spot; calyx small, 4 mm. long, much shorter than the corolla.
  b. Stems prostrate, downy. — 1. *L. procumbens*
  b. Stems upright, strigose or glabrescent.
    c. Peduncles much longer than the leaves; flowers 10 mm. long, distant; keel longer than standard and wings. — 2. *L. violacea*
    c. Peduncles mostly shorter than the leaves; flowers 6–7 mm. long, more crowded; keel shorter than standard and wings. — 3. *L. intermedia*
a. Flowers all alike, petaliferous, in dense spikes or heads, whitish or cream color with a purple spot; calyx larger, 5–7 mm. long, scarcely shorter than the corolla.
  b. Leaflets orbicular or oval, villous; spikes on peduncles longer than the leaves. — 4. *L. hirta*
  b. Leaflets elliptic-oblong or narrower, silky; spikes nearly sessile. — 5. *L. capitata*

1. **L. procumbens** *Michx.* (*L. repens* of Cayuga Fl.) PROSTRATE BUSH CLOVER.

Dry sandy banks, in acid soils; rare. Aug.

Bank of ravine n. of Enfield Glen (*D.*); s. side of Coy Glen (several collectors).

N. H. along the coast to Fla. and Tex., and in the Mississippi Valley northw. to Mo., Ill., and Ind.

2. **L. violacea** (L.) Pers. (*L. violacea,* form, no. 212 of Cayuga Fl.) BUSH CLOVER.

Dry open woodlands or thickets, in gravelly or sandy, more or less calcareous, soils; rare. July 25–Aug. 20.

Dry open woods just s. of Esty Glen (*A. J. E. & L. H. MacDaniels*); one-half mile n. of Esty Glen; Farley Point (*D.*); Utt Point.

S. N. H. to Minn., southw. to Fla., La., and e. Kans.; rare on the Coastal Plain.

3. **L. intermedia** (Wats.) Britton. (See Rhodora **26**: 29. 1924. *L. frutescens* of Gray's Man., ed. 7. *L. violacea*, form, no. 211 of Cayuga Fl.)

Dry sandy or gravelly open woods, in noncalcareous soils; freqnent. Aug.–Sept. On the hills w., s., and s. e. of Ithaca in woods with ericaceous plants and chestnut, on the ravine crests and cliffs along Cayuga Lake, and in the sandy soils n. of the lake; rare or absent in the McLean region and on the clays and richer soils back from the lake shores.

S. Me. to Minn., southw. to Fla., Ill., and Tex.; common on the Coastal Plain.

Forms occur [hillside near White Church (*D.*); bank of ravine n. of Enfield Glen (*D.*!); Cascadilla woods (*D.*!); Junius] which agree more or less closely with *L. Nuttallii* Darl. (*L. violacea*, form, no. 213 of Cayuga Fl.) and with *L. Stuvei* Nutt. (form, no. 214 of Cayuga Fl.). These specimens do not constitute distinct categories, but present various combinations of the characters of *L. intermedia* and *L. hirta*. In one instance the *Stuvei* and *Nuttallii* types were growing together and were accompanied by both the species mentioned above. In this region, therefore, the so-called *L. Nuttallii* and *L. Stuvei* are to be considered hybrids of *L. intermedia* and *L. hirta*. Along the coast, however, the real *L. Stuvei* is apparently a different plant and a distinct species.

4. **L. hirta** (L.) Hornem. BUSH CLOVER.

Dry gravelly or sandy open woods and banks, in noncalcareous, usually acid, soils; common. Aug.–Sept.

Distribution similar to that of the preceding species.

S. Me. to Minn., southw. to Fla., La., Ark., and Tex.; common on the Coastal Plain.

5. **L. capitata** Michx.

Dry sandy or gravelly banks, in acid soils; rare. Aug. 20–Sept. 20.

"Wild bank beyond the Fleming S. H." (*D.*!), that is, behind the Valley Cemetery, s. w. of Ithaca.

Me. to Minn. and Kans. southw. to Fla. and La.; common on the Coastal Plain.

16. **Vicia** (Tourn.) L.

a. Flowers sessile, axillary, in groups of 1–3.
- *b*. Leaflets of the upper leaves gradually acute. 1. *V. angustifolia*
- *b*. Leaflets of the upper leaves truncate or retuse, mucronate. 1a. *V. angustifolia*, var. *segetalis*

a. Flowers racemose or spicate, secund, on well-developed peduncles.
- *b*. Flowers 2–4 mm. long; seeds 4 (rarely 3–6); racemes 1–6-flowered. 2. *V. tetrasperma*
- *b*. Flowers 6–18 mm. long; seeds 6 or more; racemes 2–40-flowered.
  - *c*. Plant appressed-pubescent or glabrous.
    - *d*. Flowers 8–40, each 6–12 mm. long; leaflets inconspicuously veined, strigose.
      - *e*. Calyx lobes very unequal, the lower ones subulate, the upper ones almost obsolete; racemes dense, the flowers 15–40, deep blue or purple; leaflets linear or elliptic-linear, mucronate; stipules usually with a strong lobe above the base, otherwise entire. 3. *V. Cracca*
      - *e*. Calyx lobes nearly equal, short-triangular; racemes loose, the flowers 8–20, pale; leaflets elliptical, scarcely mucronate; stipules entire, or with a small tooth-like lobe at the base. 4. *V. caroliniana*

d. Flowers 2–9, each 15–18 mm. long; leaflets conspicuously pinnately veined, strigose or glabrous, elliptic-ovate, mucronate; stipules broader, with several teeth. 5. *V. americana*
c. Plant villous. 6. *V. villosa*

1. **V.** ANGUSTIFOLIA Reichard. (*V. sativa* of Cayuga Fl.) COMMON VETCH.

A weed by roadsides and on banks, in rich gravelly soils; frequent. July.

Ball Hill, Danby; Connecticut Hill; n. of Enfield Glen; South Hill; C. U. campus, near the Veterinary College; e. of McLean; n. of King Ferry; s. of Willets.

Throughout the Eastern States. Naturalized from Eu.

Extremely variable as to width and apex of leaves, passing to the following variety.

1a. **V.** ANGUSTIFOLIA Reichard, var. SEGETALIS (Thuill.) Koch.

In situations similar to the preceding; occasional.

Roadside near Newfield station; Six Mile Creek.

Range probably similar to that of the species.

2. **V.** TETRASPERMA (L.) Moench.

Gravelly calcareous shores; rare. June.

S. side of Taughannock Point, 1895 (*K. M. W.*), now abundant.

E. Que. to Ont., southw. to Fla. and Miss. Naturalized from Eu.

3. **V.** CRACCA L. WILD VETCH.

Fields and roadsides, in gravelly or sandy, not too acid, soils; rare. June 10–July 15.

Appearing as though introduced: "on the sand bank west of Mr. Howard Williams', since 1871" (*D.*); Thurston Ave., Ithaca; old field, n. side Taughannock Gorge; roadside e. of Clyde; near the Poultry Building, C. U. campus. [More frequent in Cortland Co.].

Newf. to Minn. and B. C., southw. to n. N. J., Ky., and Iowa. Naturalized from Eurasia. Possibly native in the North.

4. **V. caroliniana** Walt. SPRING VETCH.

Dry slopes in open woods, in clay and stony clay soils; common. May 10–30.

Abundant on South Hill and along the lake shore from Cayuga Heights northw.; absent on the gravels of the higher hills and in the McLean region.

Ont. to Minn., southw. to Ga. and Kans.; rare or absent in N. E. and on the Coastal Plain.

5. **V. americana** Muhl. VETCH.

Damp alluvial clays and cliff talus mixed with clay; frequent. June 10–July 10.

Mostly along the shores of Cayuga Lake and in the lake marshes: Renwick Marsh; near the Remington Salt Works; Esty Glen; n. of Union Springs; Willets; and elsewhere. Not found away from the lake.

N. Y. to Minn. and the Pacific coast, southw. to Va. and Kans., exclusive of the Atlantic Coastal Plain.

6. **V.** VILLOSA Roth. HAIRY OR WINTER VETCH.

Roadsides, lawns, fields, and waste places, in various soils; an occasional escape from cultivation. June–Sept.

Native of Eurasia.

17. Lathyrus (Tourn.) L.

a. Leaflets 8–12, broad and large; flowers 10–25, purple. [*L. venosus*]
a. Leaflets 4–8; flowers 2–8 (see also 3d *a*).

b. Longest petioles 5–15 mm. long; flowers purple; calyx 7–9 mm. long.
c. Leaflets linear to elliptic-lanceolate, 3–8.5 cm. long; stem stout, usually winged, 1.5–3 mm. in diam. (exclusive of wings) below the lowest peduncle; flowers 1.5–2.5 cm. long. 1. *L. palustris*
c. Leaflets elliptic to oval, 2–4 cm. long; stem slender, usually wingless, 0.7–1.5 mm. in diam. below the lowest peduncle; flowers 1–1.5 cm. long. 1a. *L. palustris*, var. *myrtifolius*
b. Longest petioles 20–30 mm. long; flowers pale yellow; calyx 9 mm. long; leaflets elliptic-oval. 2. *L. ochroleucus*
a. Leaflets 2; flowers many, large and showy. 3. *L. latifolius*

[**L. venosus** Muhl.

"?Geneva" in Sartwell's Herb. (*D.*); "Cayuga L." in Thomas's Herb. (*D.*); not seen since, and its occurrence in this flora doubtful.

N. J. and Pa. to Sask., southw. to Ga., La., and Ark.; rare or absent on the Coastal Plain.

The first locality is admittedly doubtful, and at the second station the plant may have been cultivated in the Thomas garden.]

1. **L. palustris** L.

Borders of marshes in alluvial soil and on the shore of Cayuga Lake, apparently in nearly neutral soils; infrequent. July.

Found only in the vicinity of Cayuga Lake and the marshes on the Ontario plain, and possibly influenced by salts in the soil: s. w. corner of the lake (*D.*); lake shore at Marions (*D.*); Bushy Point (*D.*); Salt Pond w. of Howland Island; Montezuma.

Lower St. Lawrence River to Man. and Oreg., southw. to s. Me., Vt., cent. N. Y., Ohio, and Ill. Found also in Eurasia.

1a. **L. palustris** L., var. **myrtifolius** (Muhl.) Gray.

In situations similar to the preceding; infrequent. July–Aug.

In the Cayuga Lake Basin, found only near Cayuga Lake, and probably influenced by salts in the soil: Renwick; near Marions (*D.*); near Tremans (*D.*); Myers Point (*D.*); near Union Springs (*D.*!); Canoga Marshes; Montezuma Marshes; Spring Lake; Crusoe Lake.

W. Que. to Wis. and Man. (?), southw. to n. N. J., Pa., N. C. (?), Tenn (?), Ohio, and Ind.

2. **L. ochroleucus** Hook.

Dry hillsides and thickets, in nearly neutral stony clay soils; frequent. May.

N. of White Church; s. of Brookton; Six Mile Creek; Fall Creek, especially at Beebe Lake (*D.*!); other ravines (*D.*!); Lake Ridge, common; n. of Sheldrake; Paine Creek glen; Utt Point; n. of Levanna; ravines and woods of Cayuga Lake shore (*D.*!); and elsewhere.

W. Que. to Sask., southw. to n. N. J., Pa., the Great Lakes, Iowa, S. Dak., Wyo., and B. C. (?).

3. **L.** LATIFOLIUS L. PERENNIAL PEA.

Roadsides and fence rows; rare. Aug.–Oct.

Near Forest Home, 1919 (*A. R. Bechtel*); bank of Fall Creek, Etna; e. branch of Salmon Creek, toward North Lansing; and probably elsewhere.

Escaped from cultivation. Native of Eu.

18. **Apios** (Boerh.) Ludwig

1. **A. tuberosa** Moench. GROUNDNUT.

Low thickets, in rich sandy alluvial soil; common. Aug.–Sept. 10.

Abundant in the Inlet Valley, along Cayuga Lake, and in the sandy soils n. of the lake; elsewhere scarce or absent.

N. B. and N. S. to Minn., southw. to Fla., La., and Kans., including the Coastal Plain.

The genus was apparently first separated from Glycine by Ludwig in 1790, as Apios. Bradleia Adans. seems to be a straight synonym of Glycine L.

19. **Amphicarpa** Ell.

a. Pubescence appressed; leaves thin, the terminal leaflet 4–6 cm. long; bracts 2–3 mm. long. 1. *A. monoica*

a. Pubescence spreading, hirsute; leaves firmer, the terminal leaflet 5–8 cm. long; bracts 3–4 mm. long, more silky. 2. *A. Pitcheri*

1. **A. monoica** (L.) Ell. HOG PEANUT.

Low or upland thickets, in more or less sandy or gravelly soils; common and widely distributed. Aug.

N. B. and N. S. to Man., southw. to Fla., La., and Nebr., including the Coastal Plain.

Some authors adopt the name *A. comosa* for this species, but the identity of the *Glycine comosa* L. on which this was founded is not clear. The generic name *Amphicarpa* is in the list of *nomina conservanda* of the International Code.

2. **A. Pitcheri** T. & G. (*A. monoica,* in part, of Cayuga Fl.) HOG PEANUT.

Low thickets and around marshes, in richer, more alluvial, soil than the preceding; common. Aug.

Mass. to D. C. along the coast; and from w. N. Y. to S. Dak., southw. to La. and Tex.

67. **LINACEAE** (FLAX FAMILY)

Linum (Tourn.) L.

a. Flowers blue; capsules 10–12 mm. in diam. 1. *L. usitatissimum*

a. Flowers yellow; capsules 3–6 mm. in diam.

b. Leaves elliptic-lanceolate or linear-oblong; false septa in capsules nearly complete, not ciliate. 2. *L. virginianum*

b. Leaves subulate or linear; false septa very incomplete, ciliate. [*L. sulcatum*]

1. **L.** USITATISSIMUM L. COMMON FLAX.

Along railroad tracks and roadsides, in gravelly soils; occasionally spontaneous. July.

Frequent in railroad yards in the basin, and on garbage dumps. Native of Eu.

2. **L. virginianum** L. YELLOW FLAX.

Dry sandy or gravelly exposed banks, in more or less acid soils; infrequent. July–Aug.

Valley near West Danby (*D.*); near White Church (*D.*); Newfield Glen; Coy Glen (*D.*!); near South Hill Marsh; Fall Creek (*D.*!); near Newton Ponds.

S. Me. to s. Ont., southw. to Ga. and Ky.; occasional on the Coastal Plain.

[**L.** SULCATUM Riddell.

Appeared in 1903 on Thurston Ave., Ithaca (*F. W. Foxworthy* in C. U. Herb.); apparently temporarily adventive, and not persisting.]

68. OXALIDACEAE (WOOD SORREL FAMILY)

1. Oxalis L.

a. Flowers pale pink or white, purple-veined; plant scapose. 1. *O. montana*
a. Flowers yellow; plant caulescent.
b. Flowers in well-developed plants 2–4 together, subumbellate; pedicels in fruit reflexed, but capsules erect; capsule cylindrical, varying in length; hairs of the capsule, if any, fine and dense; true rhizomes wanting, except in no. 4.
c. Plant creeping, rooting at the nodes; stipules broad, rounded, brownish; fruiting pedicels short, mostly 4–12 mm. long; capsule 8–15 (18) mm. long, abruptly acute, evenly and rather closely puberulent, often viscid; pubescence of stem and petioles spreading. 2. *O. corniculata*, var. *viscidula*
c. Plant normally erect, but sometimes with a decumbent and rooting base; stipules usually oblong or obsolete, greenish; fruiting pedicels averaging longer, 10–25 mm. long.
d. Body of capsule (10) 15–25 mm. long, densely puberulent and often with some longer viscid hairs intermixed, abruptly acute, short-beaked; styles about 2 mm. long; petioles and pedicels rather stout; stipules oblong, firm; pubescence of stem, petioles, and pedicels, appressed; plant pale, often slightly succulent.
e. Pubescence of the capsule with some loose subvillous viscid hairs. 3. *O. stricta*
e. Pubescence of the capsule appressed, nonviscid. 3a. *O. stricta*, var. *piletocarpa*
d. Body of capsule 9–15 mm. long, sparingly puberulent below, more densely so at apex, generally more gradually pointed; styles 2–4 mm. long; petioles and pedicels more slender; stipules obsolete; pubescence of stem rather loose, curly and tawny; plant greener, not succulent. 4. *O. florida*
b. Flowers in well-developed plants 2–many, cymose; pedicels in fruit spreading, not reflexed; capsule oblong-conic, 5–12 mm. long, with scattered, spreading, more or less viscid hairs, or nearly glabrous, tapering to the long, strigose styles; stipules obsolete; cauline hairs spreading or subappressed, sometimes wanting; plant producing long slender horizontal rhizomes. 5. *O. europaea*

1. **O. montana** Raf. (See Rhodora 22: 143. 1920. *O. americana* Bigel. *O. acetosella* of Cayuga Fl.) PINK WOOD SORREL.

Damp humus in deep woods, especially of hemlock; frequent. June–July 15.
Headwaters Swamp; Enfield Glen (*D.*1); Ellis Hollow Swamp (*D.*1); Fall Creek; Dryden Lake; Fir Tree Swamp, Freeville, and Freeville Bog; Woodwardia Bog; McLean Bogs; Beaver Brook; Chicago Bog; Lake Como; and elsewhere.
N. S. and e. Que. to Sask., southw. to n. and w. N. E., N. Y., and in the mts. to N. C.

2. **O.** CORNICULATA L., var. VISCIDULA Wiegand. (*O. repens* of Gray's Man., ed. 7.) CREEPING YELLOW WOOD SORREL.

In greenhouses and on gravel walks adjoining; occasional. June–Aug.
Walks near the Sage College greenhouses, formerly; in the Agricultural College greenhouses.
Scattered through the Northern States, mostly near greenhouses or on ballast; almost cosmopolitan, but in the Northern and Eastern States introduced.
For a revision of the yellow-flowered species of Oxalis, see Rhodora 27: 113. 1925.

3. **O. stricta** L. YELLOW WOOD SORREL.

Dry gravelly, sandy, or stony fields and waste places; rare. May–Aug.

S. e. corner of Newfield Township; n. of lower Enfield Glen.

P. E. I. to B. C., southw. to Fla., Tex., and Mex., including the Atlantic Coastal Plain.

3a. **O. stricta** L., var. **piletocarpa** Wiegand.

In situations similar to the preceding; frequent.

Enfield Glen; Lick Brook; Buttermilk Glen; Coy Glen; Cornell and Cayuga Heights; Ringwood; Dryden; Paine Creek; and elsewhere.

P. E. I. to B. C., southw. to N. J., also in Wyo. Introduced in Eu.

4. **O. florida** Salisb. (*O. filipes* of Gray's Man., ed. 7.) YELLOW WOOD SORREL.

Dry gravelly or stony exposed pasture land or fields, in sterile soils; frequent. May–Aug.

N. of Spencer Lake; stony field on moraine n. w. of North Spencer; gravelly flats along the Inlet, Newfield-Ithaca town line; n. of Buttermilk Glen; Ellis Hollow; two miles n. of Etna; pasture s. e. of Mud Pond, McLean Bogs; knolls around Chicago Bog; and elsewhere.

Me. to N. Y. and Fla.; rare on the Coastal Plain.

A single colony at Chicago Bog contained forms with prominently dark-spotted, faintly spotted, and unspotted corollas. In many respects *O. florida* appears like a hybrid of *O. europaea* and *O. stricta*.

5. **O. europaea** Jord. (*O. corniculata* of Gray's Man., ed. 7.) YELLOW WOOD SORREL.

Cultivated fields, waste places, and other open locations, in dry or damp gravelly or stony soils: common. June–Sept.

Que. to N. Dak., southw. to Ga., Tenn., Okla., and Colo. Introduced into Europe from America.

Besides the typical plant, forma *cymosa* (Small) Wiegand and forma *villicaulis* Wiegand have been found in the Cayuga Lake Basin. The *O. corniculata*, var. *stricta*, of Dudley's *Cayuga Flora* included both *O. stricta* and *O. europaea*.

69. GERANIACEAE (GERANIUM FAMILY)

a. Anther-bearing stamens 10, rarely 5; tails of the carpels not bearded, upcurled when ripe; leaves palmately veined. 1. GERANIUM

a. Anther-bearing stamens 5; tails of the carpels bearded within, not upcurled but often spirally twisted when ripe; leaves pinnate. 2. ERODIUM

1. Geranium (Tourn.) L.

a. Flowers large; petals about 15 mm. long; fruit 30 mm. long; lobes of the ovary villous; plants perennial. 1. *G. maculatum*

a. Flowers smaller; petals 12 mm. long or less; fruit 7–20 mm. long; plants annual or more rarely biennial.

b. Leaves palmately 3–5-cleft or -parted; lobes cleft; corolla 10 mm. long or less; lobes of the ovary glabrous or pubescent, not wrinkled, not separating from the valves of the beak; beak pubescent.

c. Lobes of the ovary hairy.

d. Seeds pitted; beak 17–23 mm. long; ovary and beak hirsute; sepals awned.

e. Flowers crowded; slender tip of beak 2 mm. long. 2. *G. carolinianum*

e. Flowers loose, scattered; slender tip of beak 3–4 mm. long. 3. *G. Bicknellii*

d. Seeds smooth; beak 7–11 mm. long; ovary and beak puberulent; sepals awnless. 4. *G. pusillum*

c. Lobes of the ovary glabrous or nearly so.
d. Pedicels 5–18 mm. long; sepals awnless; petals 4–5 mm. long; lobes of the ovary entirely glabrous, transversely wrinkled; seeds smooth or striate. 5. *G. molle*
d. Pedicels 25–75 mm. long; sepals awned; petals 8–10 mm. long; lobes of the ovary subglabrous, not wrinkled; seeds pitted. [*G. columbinum*]
b. Leaves palmately 3–5-divided; divisions 1–2-pinnatifid; corolla 10–12 mm. long; lobes of the ovary glabrous, wrinkled, separating from the valves of the beak; beak smooth. 6. *G. Robertianum*

1. **G. maculatum** L. WILD CRANESBILL.

Dry gravelly, sandy, or stony banks and borders of woods, in acid or neutral, or less frequently in slightly calcareous, soils; common, and generally distributed, especially about ravines. May–June.

Cent. Me. to Man., southw. to Ga., Ala., and Nebr.; less frequent on the Coastal Plain.

2. **G. carolinianum** L. (*G. carolinianum,* in part, of Cayuga Fl.)

Dry sandy or gravelly noncalcareous soils and rocks; rare. May.

Buttermilk Glen, 1915 (*C. C. Thomas*); Stewart Ave., Ithaca, 1916 (*H. V. DeMott*).

E. Mass. and Ont. to B. C., southw. to Fla. and Mex., including the Atlantic Coastal Plain.

3. **G. Bicknellii** Britton. (*G. carolinianum,* in part, of Cayuga Fl.)

In situations similar to the preceding, or perhaps more often in woods and clearings, but in more calcareous or richer gravelly soils; rare. May–June 15.

Near Negundo Woods (*D.* in C. U. Herb.); s. exposure of ravine bank above second dam, Six Mile Creek (*A. R. Bechtel & K. M. W.*).

Newf. to B. C., southw. to N. E., N. Y., Mich., and Utah; rare or absent on the Atlantic Coastal Plain.

4. **G.** PUSILLUM Burm. f.

A weed in rich soil, cultivated ground, and lawns, and by roadsides; occasional. June–July.

S. of Coy Glen; Albany St., Ithaca, 1882 (*D.*); C. U. campus, near Poultry Building and w. of Caldwell Hall; Fiske-McGraw (Chi Psi) grounds, 1885 (*D.*); Forest Home; Lake St., opposite Percy Field. Largely of recent introduction.

Mass. and Ont. to B. C., southw. to N. J., N. C., Nebr., and Utah. Adventive from Eu.

5. **G.** MOLLE L.

A weed in lawns; frequent. June–July.

Quarry St., Ithaca; C. U. campus, in several places; Girls' Playground, Cascadilla Glen; and elsewhere. Of recent introduction.

Me. to Ont. and Ohio, southw. to N. Y. and N. C.; also on the Pacific coast. Adventive from Eu.

[**G.** COLUMBINUM L. LONG-STALKED CRANESBILL.

A weed of field borders; rare.

Near Newfield Glen, 1921 (*R. C. Cowles*), doubtfully established.

N. J. and Pa. to Va., also in S. Dak. Native of Eu.]

6. **G. Robertianum** L. HERB ROBERT.

Damp shaded rocky woods and ravine banks, in calcareous regions; common. May–Sept.

Newf. to Man., southw. to N. J., Pa., and Mo.; also in Eurasia and Africa.

2. Erodium L'Her.

1. **E.** CICUTARIUM (L.) L'Her. STORKSBILL.

A weed in waste places; rare. Apr. 15–May.

Occurring since 1917 between Roberts Hall and the Home Economics Building, C. U. campus.

Distributed over most of N. A. except in the northern part. Adventive from Eu.

70. RUTACEAE (RUE FAMILY)

1. Zanthoxylum L.

1. ***Z.* americanum** *Mill.* NORTHERN PRICKLY ASH.

Thickets, in rich alluvial soils and often in drier calcareous soils; frequent. May.

Shores of Summit Marsh; Inlet, below Newfield station, abundant; Negundo Woods (*D.*); Renwick woods; Renwick slope; "occasional throughout the Neguaena valley and along the low points on the lake-shore. Also in Lansing and Dryden" (*D.*); n. of the Republic Inn, Freeville; Mud Creek, Freeville; Cortland marl ponds; n. of Esty; Salmon Creek valley, abundant; Montezuma Marshes; near Lowery Ponds; near Howland Island, abundant; along Black Brook, Tyre; and elsewhere.

W. Que. to Minn., southw. to N. J., Ga., Ky., Mo., and e. Kans.; rare or absent on the Coastal Plain.

71. SIMARUBACEAE (QUASSIA FAMILY)

1. Ailanthus Desf.

1. **A.** ALTISSIMA (Mill.) Swingle. (See Journ. Wash. Acad. Sci. **6**:490. 1916. *A. glandulosa* Desf.) TREE OF HEAVEN. AILANTHUS.

Thickets, roadsides, and ravine banks, in various soils; frequent. July.

Escaped from cultivation: South Hill (*D.*!); streets of Ithaca; "north of Glen Pond. Cascadilla Cr., below the bridge" (*D.*!); circus common, s. of Percy Field (*D.*!); near McKinneys (*D.*); and elsewhere.

Widely planted and escaped. Native of Asia.

72. POLYGALACEAE (MILKWORT FAMILY)

1. Polygala (Tourn.) L.

a. Flowers large, 18 mm. long, few, loosely arranged, purple; leaves ovate. 1. *P. paucifolia*

a. Flowers small, 5 mm. long or less, in heads or spikes; leaves narrow.

b. Plant perennial, from stout roots; flowers white; leaves alternate. 2. *P. Senega*

b. Plant annual.

c. Flowers purple or greenish purple, in globular or broadly oblong heads; leaves alternate. 3. *P. sanguinea*

c. Flowers white or greenish white, rarely purple-tinged, in slender spikes.

d. Spikes dense; petals greenish white or tinged with dull purple; lower leaves verticillate. 4. *P. verticillata*

d. Spikes less dense; petals white, often tinged with pink; lower leaves usually scattered. 4a. *P. v.*, var. ***ambigua***

1. **P. paucifolia** Willd. FRINGED POLYGALA. FLOWERING WINTERGREEN.

Dry woods and banks, in neutral or subacid, sandy or gravelly, soils, especially under evergreens; frequent. May.

Most abundant about the ravines of the basin. Occurring also on the Caroline hills, in Michigan Hollow, on South Hill, and in Newfield, Mecklenburg, and elsewhere. Absent in the McLean region and on the clays and richer soils back from the lake shores.

E. Que. to Man., southw. to Ga., Ill., and Minn., but rare on the Coastal Plain. Individuals with white flowers have been reported from several localities.

2. **P. Senega** L. SENECA SNAKEROOT.

Steep slopes and rocky ledges, in rich calcareous clay-gravel or talus soils; frequent. May 15–June 15.

Bald Hill, Caroline, and Caroline Pinnacles (*D.*); Inlet Valley, Newfield-Ithaca town line; ravine n. of Buttermilk Glen; Coy Glen; Six Mile Creek (*D.*!); Beebe Lake; e. of Forest Home; Renwick slope; ravines of Cayuga Lake (*D.*); lake cliffs n. of Ludlowville; King Ferry; Paine Creek; Big Gully; especially frequent on ravine banks and along the Cayuga Lake shore. Absent in the McLean region.

N. B. to Hudson Bay and Alberta, southw. to N. C. along the mts., and to Mo. and Ark.; rare or absent on the Coastal Plain and in granitic N. E.

3. **P.** SANGUINEA L.

Open fields, in damp, sandy, poorly drained, acid soils; scarce. July–Aug.

Pasture, n. w. corner of Michigan Hollow Swamp; hill w. of West Danby; border of Slaterville Swamp; fields just n. of South Hill Marsh above and below wooded terrace; pasture e. of McLean Bogs; Junius; near Montezuma Marshes. Probably of recent introduction in this region. First collected at Michigan Hollow by Rowlee and Wiegand in 1893.

N. S. to Ont. and Minn., southw. to N. C., La., and Kans., including the Coastal Plain.

4. **P. verticillata** L.

Dry open sunny slopes, in sandy or gravelly, neutral or acid, soils; frequent. July–Sept.

Pasture n. of Spencer Lake; Key Hill; Enfield Glen; Coy Glen; South Hill; Fall Creek, e. of Forest Home; s. slope of Turkey Hill; Esty Glen; n. e. of Shurger Glen; gravelly bank w. of Lowery Ponds; absent in the McLean region.

Me. to Sask., southw. to Fla., La., and Mex., including the Coastal Plain.

4a. **P. verticillata** L., var. **ambigua** (Nutt.) Wood.

Old flatland pastures; rare.

Between Spencer Lake and Summit Marsh near base of east hill, 1916, and persisting since.

Me. to Mich., southw. to Ga. and La.

Sepals and persistent part of spike slightly longer than in the typical form.

73. EUPHORBIACEAE (SPURGE FAMILY)

a. Ovary sessile; flowers with a calyx and no involucre, each pistillate flower subtended by a large lobed bract; juice not milky. 1. ACALYPHA

a. Ovary apparently stalked; a stalked pistillate flower and several staminate flowers together, surrounded by a cup-shaped involucre provided with glands; juice milky. 2. EUPHORBIA

1. Acalypha L.

1. **A. virginica** L. THREE-SEEDED MERCURY.

A weed in dry open fields and by roadsides, in gravelly or sandy noncalcareous soils; common. Aug–Sept.

Confined entirely to the region about Ithaca and the shore of Cayuga Lake. There are no records from the surrounding towns back from the lake.

N. S. to Minn., southw. to Fla. and Tex.; common on the Coastal Plain.

2. Euphorbia L.

a. Flowers axillary; leaves opposite, serrate; glands 4, appendaged.
  b. Stems ascending or erect, nearly smooth; leaves 1.5–3.5 cm. long, with a purple spot; capsule broadly ovate, sharply angled, smooth; seeds ash color. 1. *E. nutans*
  b. Stems more prostrate, hairy; leaves 1.5 cm. long or less.
    c. Stems reddish or greenish, hirsute; leaves bright green; capsule oval, retuse, bluntly angled, smooth; seeds ash color. 2. *E. hirsuta*
    c. Stems flesh color, more crisp-puberulent; leaves dull, often with a purple spot; capsule ovate, acutely angled, hairy; seeds reddish flesh-color. 3. *E. maculata*
a. Flowers in terminal, simple or compound, umbels, or the inflorescence dichotomous; lower leaves all alternate, serrate or entire.
  b. Appendages of the glands large, showy, white; leaves entire, linear-elliptic. 4. *E. corollata*
  b. Appendages wanting; leaves linear or obovate.
    c. Glands orbicular; leaves obovate, serrate; seeds sculptured; annuals. 5. *E. Helioscopia*
    c. Glands crescent-shaped; leaves entire.
      d. Leaves obovate; seeds sculptured; annuals. 6. *E. Peplus*
      d. Leaves linear to oblong; seeds smooth; perennials.
        e. Primary bracts 13–20 mm. wide; leaves 4–25 mm. wide; glands horned.
          f. Leaves 18–25 mm. wide, bright green; pods wrinkled. 7. *E. lucida*
          f. Leaves 4–9 mm. wide, glaucous; pods minutely granular or smooth. 8. *E. Esula*
        e. Primary bracts 4–7 mm. wide; leaves 1–2 mm. wide; glands scarcely horned; pods minutely granular. 9. *E. Cyparissias*

1. **E. nutans** Lag. (*E. Preslii* of manuals. *E. hypericifolia,* in part, of Cayuga Fl.) SPURGE.

A weed on open dry gravel or cinder banks, and in waste places; frequent. July–Sept.

Found especially on railroad embankments; rarely elsewhere in the basin. Considered native, but possibly introduced from farther south.

Mass. to Ont. and Wis., southw. to Fla., Nebr., and Mex.; infrequent on the Coastal Plain.

Dr. B. L. Robinson (see Gray Herb. Exsic., no. 229) has noted the verification of the identity of *E. nutans* Lag. and *E. Preslii* Guss. The former is the older name.

2. **E. hirsuta** (Torr.) Wiegand. (*E. hypericifolia,* in part, of Cayuga Fl. *E. Rafinesqui* Greene.) HAIRY SPURGE.

In situations similar to the preceding, also in roadside gutters; common. July–Sept.

E. Que. to w. Ont., southw. to N. J., Pa., Ohio, and Ill.; infrequent on the Coastal Plain.

When attacked by the rust fungus, *Aecidium Euphorbiae* Gmel., the plant grows stiffly erect. This Euphorbia is not clearly *E. vermiculata* Raf., though House (Bul. N. Y. State Mus. 254, 1924) considers the two synonymous.

3. **E. maculata** L. MILK PURSLANE.

In locations similar to those of the two preceding species; common. July–Oct.
N. E. to Ont. and Wyo., southw. to Fla., Tex., and Calif., including the Atlantic Coastal Plain.

[E. MARGINATA Pursh. SNOW-ON-THE-MOUNTAIN.

Springs up occasionally on garbage dumps but is not established.]

4. E. COROLLATA L. FLOWERING SPURGE.

Dry sandy fields; rare. Aug.
Hillside e. of Newton Ponds, first observed in 1916; recently introduced, but apparently well established.
N. Y. to Minn., southw. to Fla., La., and Tex. Naturalized northeastw.

5. E. HELIOSCOPIA L. WARTWEED.

A weed in rich gardens, fields, and waste places, in sandy or gravelly, probably calcareous, soils; local. July–Oct.
Of recent introduction: Danby, 1916 (*Rev. Mr. Toby*); n. of Etna; near Red Mills, 1922 (*W. C. Muenscher*); Wells College campus, 1915 (*Miss Ida L. Reveley*); gardens, Levanna to Union Springs, abundant.
Abundant, e. Que. to Ont.; local southw. to Pa., Ohio, and Ill. Naturalized from Eu.

6. E. PEPLUS L. PETTY SPURGE.

A weed in rich garden soils and dooryards, in gravelly calcareous regions. July–Oct.
Frequent in Ithaca, but not seen elsewhere: Giles St.; corner of Lynn and Court Sts.; Buffalo St. (*D.*!); E. State St. (*D.*!); Aurora St. (*D.*); C. U. campus, in several places; President White Place (*D.*); waste soil, Six Mile Creek.
N. B. to Iowa, southw. to N. J. and Pa. Naturalized from Eu.

7. E. LUCIDA Waldst. & Kit.

A weed in fields and by roadsides, in rich sandy or gravelly (clay?) soils; rare. June–Aug.
E. of Summit Marsh, 1925; n. of Danby village, 1923 (*W. C. Muenscher*); field and roadside n. of Midway, 1919 (*K. M. W., A. J. E., & L. F. Randolph*).
Susquehanna Valley in N. Y. and Pa., and now in the Cayuga Lake Basin. Adventive from Eu.

8. E. ESULA L.

A weed in gravelly fields and roadsides; rare. June–July.
Groton, 1875 and again 1884 (*D.*); near Prof. Dietrich's, Cayuga Heights Road, 1915 (*L. H. MacDaniels & A. J. E.*).
S. Me. to Mich., southw. to N. J. and Pa. Naturalized from Eu.

9. E. CYPARISSIAS L. CYPRESS SPURGE.

A weed by roadsides and in cemeteries, in gravelly soils, apparently with little reference to lime content; frequent. May–June.
South Hill; upper Coy Glen; e. of Ellis Hollow; Ringwood; Galen; and elsewhere. Found in most cemeteries.
N. E. to Colo., southw. to Va. Naturalized from Eu.

74. CALLITRICHACEAE (WATER STARWORT FAMILY)

1. Callitriche L.

a. Fruit longer than broad, slightly notched; each half with two sharp keels separated by a wide groove. 1. *C. palustris*
a. Fruit as broad as or broader than long, widely notched; each half obtusely 2-keeled, with a narrow groove between the keels. 2. *C. heterophylla*

1. **C. palustris** L. (*C. verna* of Cayuga Fl.) WATER STARWORT.

Ditches and pools, in limy regions; frequent. July–Oct.

Between Summit Marsh and Spencer Lake; Ithaca fair grounds; n. of Ringwood; near Dryden Lake; near Townley Swamp; East Lansing; Myers Point; outlet of North Spring, Union Springs; and elsewhere.

Nearly throughout the U. S. and Canada, but rare or absent on the Atlantic Coastal Plain; almost cosmopolitan.

2. **C. heterophylla** Pursh. WATER STARWORT.

Ditches and pools, often on the mud when these are exsiccated, in acid or alkaline waters; common. June–Sept.?

Newf. to Man., southw. to Fla., La., Mo., and Colo., including the Coastal Plain.

75. LIMNANTHACEAE (FALSE MERMAID FAMILY)

1. Floerkea Willd.

1. **F. proserpinacoides** Willd. FALSE MERMAID.

Damp alluvial woods and thickets; scarce. May.

Enfield Glen; Negundo Woods (*D.*!); Buttermilk Creek, above the upper reservoir (*D.*); s. side of Amphitheater, Six Mile Creek; Ellis Hollow, below the swamp (*D.*!); woods n. e. of Freeville; s. e. of Mud Pond, McLean Bogs; near Beaver Brook (*D.*).

W. Que. to Ont. and Wis., southw. to Del., Tenn., and Mo.; rare or absent on the Coastal Plain and in granitic N. E. A plant of the rich soils of the Mississippi Basin.

76. ANACARDIACEAE (CASHEW FAMILY)

1. Rhus (Tourn.) L.

a. Leaves pinnate.
  b. Leaflets serrate; fruit with crimson hairs; stone smooth; plant not poisonous.
    c. Twigs and petioles villous-hirsute. 1. *R. typhina*
    c. Twigs and petioles glabrous. 2. *R. glabra*
  b. Leaflets entire; fruit grayish white; stone striate; plant poisonous to the touch. 3. *R. Vernix*
a. Leaves 3-foliolate.
  b. Terminal leaflet long-stalked; flowers in loose clusters, appearing later than the leaves, greenish; fruit grayish white, glabrous or nearly so; stone striate; plant poisonous. 4. *R. Toxicodendron*
  b. Terminal leaflet nearly sessile; flowers in dense clustered spikes, appearing before the leaves, yellow; fruit crimson-hirsute; stone not striate; plant not poisonous. 5. *R. canadensis*

1. **R. typhina** L. STAGHORN SUMACH.

Dry banks and thickets, in gravelly, more or less calcareous, soils; common. July 1–15.

Not found in the acid soils with chestnut and ericaceous plants.

E. Que. to Ont. and S. Dak., southw. to Ga., Ind., and Miss., but rare on the Coastal Plain.

R. hirta (L.) Sud., an earlier name, was based on an abnormal or monstrous form of the species, and therefore is not valid.

2. **R. glabra** L. (Including *R. ithacensis* Greene.) SMOOTH SUMACH.

Dry sandy and gravelly banks, in more sterile and acid soils than the preceding; frequent. July 10–30.

Coy Glen; South Hill, near the chain works; Six Mile Creek, near the pumping station; Ithaca flats, near the Cornell boathouse; "abundant on shore of Cayuga Lake" (*D.*); Big Gully; and elsewhere. Not found in Cortland Co. or in the McLean region.

N. S. to Minn. and B. C., southw. to Fla., Miss., and La.; more frequent than *R. typhina* on the Atlantic Coastal Plain, but less common there than elsewhere.

3. **R. Vernix** L. (*R. venenata* of Cayuga Fl.) POISON SUMACH. POISON DOGWOOD. POISON ELDER.

Boggy acid soils; frequent. June 25–July 20.

Headwaters Swamp; Michigan Hollow Swamp; Larch Meadow; Indian Spring marsh (*D.!*); Ringwood; McLean Bogs; Junius bogs.

W. Me. to w. Ont. and Minn., southw. to Fla., La., and Mo.; common on the Coastal Plain.

4. **R. Toxicodendron** L. (Including *R. radicans* L.) POISON IVY. POISON OAK.

Fence rows, rocky banks, and often in alluvial woodlands, in dry or damp, sandy or gravelly, noncalcareous soils; common. June 15–July 15.

N. S. to the Rocky Mts., southw. to Fla., Tex., and Mex., including the Atlantic Coastal Plain.

Very variable in habit and habitat. The high-climbing form of low woodlands has been separated from the erect form on walls and rocks as var. *radicans* (L.) Torr., but an investigation of a large amount of material has shown no constant structural differences. Both forms are variable as to pubescence and as to dentation of the leaf.

5. **R. canadensis** Marsh. (*R. aromatica* of Cayuga Fl.) AROMATIC SUMACH.

Dry rocky banks with clay, over noncalcareous sandstones; frequent. May.

"High 'Pinnacles' at West Danby and White Church" (*D.!*); Buttermilk Glen; n. e. slope of South Hill (*D.!*); Six Mile Creek (*D.!*); Fall Creek, near Triphammer Falls (*D.*) and near the mills; in other ravines of the basin (*D.!*); especially abundant on the e. shore of Cayuga Lake (*D.!*).

W. Vt. to Minn., southw. along the mts. to Fla., and to La. and Kans.; rare or absent on the Coastal Plain.

77. AQUIFOLIACEAE (HOLLY FAMILY)

a. Leaves serrate; petals oval; stamens adnate to base of corolla. 1. ILEX
a. Leaves entire; petals linear; stamens free from the corolla. 2. NEMOPANTHUS

1. Ilex L.

1. **I. verticillata** (L.) Gray. WINTERBERRY. BLACK ALDER. DECIDUOUS HOLLY.

Swampy woods and thickets, in acid soils; frequent. July.

Summit Marsh; swamp n. of Enfield Falls; South Hill Marsh; Indian Spring marsh (*D.!*); Ringwood; Malloryville; McLean Bogs; Lake Como; Junius bogs; Montezuma Marshes; Duck Lake; Stark Pond; and elsewhere. Especially frequent about peat bogs.

Newf. to Wis., southw. to Fla. and Mo.; common on the Coastal Plain.

Variable as to shape and texture of leaf, degree of pubescence, and color and size of twigs. The var. *tenuifolia* of Gray's Man., ed. 7 (*I. bronxensis* Britton), seems to be at most a shade form.

2. **Nemopanthus** Raf.

1. **N. mucronata** (L.) Trel. (*Nemopanthes canadensis* of Cayuga Fl.) MOUNTAIN HOLLY.

Thickets, in boggy acid soils, rarely on dry gravelly acid knolls; frequent. May 15–30.

N. of Enfield Falls; Spruce Swamp, Enfield (*D.*); Larch Meadow, formerly (*D.*); Brookton Springs (*D.*); Ringwood Swamp; Malloryville Bog; dry knolls, Malloryville; Woodwardia Bog; McLean Bogs; Junius bogs; Duck Lake.

Newf. to w. Ont., southw. to n. N. J., Ind., and Wis., and along the mts. to Va., including the northern Coastal Plain.

78. CELASTRACEAE (STAFF TREE FAMILY)

a. Leaves opposite; flowers axillary, cymose or solitary; erect or spreading shrubs. 1. EVONYMUS

a. Leaves alternate; flowers in terminal racemes; vines. 2. CELASTRUS

1. **Evonymus** (Tourn.) L.

1. **E. atropurpureus** Jacq. BURNING BUSH. WAAHOO.

Damp thickets, in alluvial soil bordering limy ledges; rare. June.

Foot of Salmon Creek Falls, e. side, 1916 (*P. B. Schumm*!). In a wild location as though native, but not very far from houses.

N. Y. to Wis., southw. to Fla., Okla., and Nebr. A plant of the Mississippi Basin.

2. **Celastrus** L.

1. **C. scandens** L. AMERICAN BITTERSWEET.

In thickets along streams and fences, and on cliffs, in gravelly or shaly neutral or calcareous soils; common. June–July 15.

Abundant along the lake cliffs, and frequent in the ravines of the basin. Not characteristic of the chestnut and ericaceous acid soils, and for the most part absent in such locations.

Me. to Mass., southw. especially in the mts. to N. C., and to Kans. and N. Mex.; less frequent on the Coastal Plain.

79. STAPHYLEACEAE (BLADDERNUT FAMILY)

1. **Staphylea** L.

1. **S. trifolia** L. AMERICAN BLADDERNUT.

Damp thickets and fence rows, in alluvium or stream gravels and in rocky places, in neutral or slightly calcareous soils; infrequent. May 10–June 15.

Creek banks between Negundo Woods and Ithaca (*D.*!); s. w. corner of Cayuga Lake (*D.*!); Six Mile Creek, on hillside s. of the lower switchback and n. of the upper reservoir; in a few small ravines along the Ledyard, Genoa, and Lansing shores (*D.*!); Frontenac Island (*D.*); Howland Island; hillside near Westbury Bog.

W. Que. and w. N. E. to Minn., southw. to S. C., Mo., and Kans.; a few stations along the Coastal Plain.

80. ACERACEAE (MAPLE FAMILY)

1. Acer (Tourn.) L.

a. Leaves simple; floral disk present.
b. Flowers corymbose, umbellate, or capitate.
c. Flowers capitate, appearing before the leaves; leaves whitened beneath, the lobes 3–5, serrate; bark coarsely fissured.
d. Petals 0; fruit woolly when young, with large divergent wings; leaves deeply cleft or parted. 1. *A. saccharinum*
d. Petals present; fruit glabrous, with small and less divergent wings; leaves lobed. 2. *A. rubrum*
c. Flowers loosely subumbellate, small, appearing with the leaves; pedicels drooping; petals 0; wings of fruit of medium size, little divergent; leaves very slightly whitened beneath, or green, the 3–5 lobes with a few coarse distant teeth or subentire; bark coarsely or finely fissured (see also 3d *c*).
d. Leaves flat, not rugose, dull green, paler beneath and slightly glaucous, glabrous; stipules small, not covering the axillary bud of the next season; branchlets brown; bark of trunk dark brown, breaking into coarse ridges or plates. 3. *A. saccharum*
d. Leaves with drooping sides, rugose, usually pubescent and yellowish green beneath, not glaucous; stipules often large, when full-grown inclosing the bud; branchlets orange-brown; bark, especially of the branches, light orange-brown, breaking into fine uniform ridges. 4. *A. nigrum*
c. Flowers corymbose, large (10–15 mm. in diam.); pedicels not drooping; petals large; leaves green beneath, with 5–7 coarsely few-toothed lobes; bark finely fissured, close. 5. *A. platanoides*
b. Flowers racemose.
c. Petals obovate, about 5 mm. long; racemes drooping; wings of fruit 7–10 mm. wide; leaves finely serrate, scarcely villous beneath; bark green, striped with white. 6. *A. pennsylvanicum*
c. Petals linear, about 2 mm. long; racemes erect; wings of fruit 3–5 mm. wide; leaves coarsely toothed, plainly villous beneath; bark reddish brown, not striped. 7. *A. spicatum*
a. Leaves pinnate; floral disk 0; petals 0; flowers racemose or subumbellate, drooping; wings of fruit large, approximate, incurved. 8. *A. Negundo*

1. **A. saccharinum** L. (*A. dasycarpum* of Cayuga Fl.) SILVER MAPLE.

Swamps, river thickets, and other low woodlands; frequent or locally common. March–Apr.

Frequent in the valley of Cayuga Lake; abundant from Ovid northw. on the Ontario plain; rare back from the lake in Lansing and Dryden; apparently absent in the towns s. and s. e. of Ithaca.

N. B. to S. Dak., southw. to Fla., Ark., Okla., and Nebr.; infrequent near the coast. *A tree primarily of the rich soils of the Mississippi* Valley.

2. **A. rubrum** L. RED MAPLE. SOFT MAPLE.

Swamps and damp hillsides, in sandy, gravelly, mucky, or even boggy, neutral or acid soil, occasionally on the floating moors of peat bogs, rarely on calcareous gravels or clays; common. Apr.

E. Que. and Me. to Man., southw. to Fla., Tex., and Kans., including the Coastal Plain.

3. **A. saccharum** Marsh. (*A. saccharinum* of Cayuga Fl.) SUGAR OR ROCK MAPLE.

Upland woods, in gravelly, mostly calcareous, soils; common. May 12–30.

Rare in the lighter chestnut acid soils of the hills w., s., and s. e. of Ithaca; infrequent along the cliffs of Cayuga Lake, but common and a characteristic forest tree in the McLean region; locally abundant wherever the soil is suitable.

Newf. to Man., southw. to Fla. and Tex.; rare or absent on the Coastal Plain.

4. **A. nigrum** Michx. f. BLACK SUGAR MAPLE.

In more loamy gravels and in bottom lands, usually in richer soil than the last preceding species; frequent. May 12–30.

Most abundant in the valley of Cayuga Lake and the stream valleys along its eastern shores; rare elsewhere: near the mouth of Enfield Glen (*D.*!) and in the alluvium through the glen; Negundo Woods (*D.*); lower Six Mile Creek; Indian Spring (*D.*!); Renwick (*D.*!); Fall Creek, n. of Forest Home; around McLean Bogs; near Chicago Bog; Taughannock Gorge; common in Salmon Creek valley; Paine Creek, abundant (*D.*!); Big Gully (*D.*!); and elsewhere.

W. Que. and w. N. H. to S. Dak., southw. to Ala., La., and Kans.; rare or absent on the Coastal Plain. A tree primarily of the rich soils of the Mississippi Valley.

A sufficiently distinct species, differing from *A. saccharum* in many characters.

5. **A.** PLATANOIDES L. NORWAY MAPLE.

Escaped from cultivation and established in Cascadilla Glen on both sides above and below the campus bridge.

Native of Eu.

6. **A. pennsylvanicum** L. STRIPED MAPLE. MOOSEWOOD.

Damp shaded woodlands in ravines and on the tops of the higher hills, in rocky gravelly neutral or acid soils; frequent. May 10–June 1.

Tops of hills in Danby, Caroline, and Spencer; Coy Glen; Six Mile Creek, Fall Creek, and other ravines; "cold woods on the high hills" (*D.*!), where it is common on the lighter, more residual soils; around McLean Bogs; rare n. of Taughannock Gorge and Shurger Glen.

E. Que. to w. Ont., southw. to Conn. and the Great Lakes, and in the mts. to Ga.

7. **A. spicatum** Lam. MOUNTAIN MAPLE.

Damp thickets on ravine slopes and in rocky woods, in gravelly or rocky calcareous (?) soils; frequent. May 15–June 15.

Especially abundant in nearly all the ravines of the basin, but mostly absent on the more residual acid soils on the hilltops, where *A. pennsylvanicum* is common; sometimes in swampy woods, as at Headwaters Swamp and Beaver Brook.

Newf. and Lab. to Hudson Bay and Man., southw. to Conn., N. Y., Tenn., Mich., and e. Iowa, and in the mts. to Ga.; almost or quite absent on the Coastal Plain. A northern plant of the Appalachian forest belt.

8. **A. Negundo** L. (*Negundo aceroides* of Cayuga Fl.) BOX ELDER.

Alluvial river banks and bottom lands; rare. May.

"In 'Negundo Woods' at a bend of the creek, 1½ miles south of Ithaca. Discovered here by Professor Branner, when a student, June, 1873" (*D.*). When first discovered there were about twenty trees. These have since been cut down, but small trees are still present on this spot. The Ithaca station is one of the few in N. Y. State for this plant. (See Dudley for fuller account.) Now widely escaped from cultivation, and in such condition frequent.

W. N. E. to Man. and the Rocky Mts., southw. to Fla., Tex., and Mex.; rare or absent in most of N. E. and on the Coastal Plain. A tree of the rich Mississippi bottom lands.

81. HIPPOCASTANACEAE (HORSE-CHESTNUT FAMILY)

1. Aesculus L.

1. **A.** HIPPOCASTANUM L. COMMON HORSE-CHESTNUT.

Escaped from cultivation in various places. May 15–30.

Native of Asia.

82. BALSAMINACEAE (TOUCH-ME-NOT FAMILY)

1. Impatiens (Riv.) L.

a. Flowers pale yellow, sparingly dotted; sac broader than long. 1. *I. pallida*
a. Flowers orange, thickly spotted with reddish brown; sac longer than broad; spur more incurved. 2. *I. biflora*

1. **I. pallida** Nutt. PALE TOUCH-ME-NOT. JEWELWEED.

Shaded rough banks and rills, and in moist woods, in rich damp gravelly or shaly calcareous soils; common. July–Aug.

Frequent in most of the ravines of the basin; "especially abundant in the vicinity of Woodwardia Swamp [!] and Mud Cr. [!], where a form having flowers of a pale pink with pink spots is found" (*D.*). A white-flowered form occurs frequently about Ithaca.

N. Me. and w. N. E. to Sask., southw. to Ga. and Kans.; rare on the Coastal Plain and in granitic N. E.

2. **I. biflora** Walt. (*I. fulva* of Cayuga Fl.) SPOTTED TOUCH-ME-NOT.

Open moist or wet situations; more abundant than the preceding. July–Aug.

Newf. to Sask., southw. to Fla. and Nebr. More tolerant of acid soils, and more frequent on the Coastal Plain, than the preceding species.

Plants with salmon-pink corolla and deeper spots are occasional (forma *Peasei* A. H. Moore, Rhodora **19**: 116. 1917).

83. RHAMNACEAE (BUCKTHORN FAMILY)

a. Ovary free from the disk; fruit fleshy; flowers axillary, greenish. 1. RHAMNUS
a. Ovary adnate at base to the disk; fruit dry; flowers mostly in terminal, paniculate, or corymbose umbels, white. 2. CEANOTHUS

1. Rhamnus (Tourn.) L.

a. Flowers 5-merous; petals 0; leaves acute, with 4–5 pairs of veins. 1. *R. alnifolia*
a. Flowers 4-merous; petals present; leaves blunt or apiculate, with 2–3 pairs of veins arising below the middle. 2. *R. cathartica*

1. **R. alnifolia** L'Her. SWAMP BUCKTHORN.

Boggy and springy meadows, mostly near marl springs; frequent. May 15–June 5.

Headwaters Swamp; near Key Hill; the narrows between Slaterville and Caroline Center; Larch Meadow (*D.*!); Fleming Meadow (*D.*); Indian Spring marsh, formerly (*D.*); Mud Creek, Freeville; Mud Pond, McLean Bogs; Cortland marl ponds; Junius; Black Brook, Tyre; e. of Clyde; Miller Bog, Spring Lake; and elsewhere.

Newf. to B. C., southw. to n. N. J., Pa., Ill., Nebr., Wyo., and Calif.; rare or absent on the Atlantic Coastal Plain.

2. **R.** CATHARTICA L. COMMON BUCKTHORN.

Gravelly roadsides, banks, and hillside pastures, in acid or calcareous regions; frequent. May 15–June 15.

Escaped from cultivation, and naturalized: n. of Summit Marsh; n. of Beebe Lake; Renwick woods (*D.*!); between Etna and Ringwood; n. of Freeville (*D.* in C. U. Herb.); w. of Woodwardia Bog; open pasture, lower Beaver Brook; near Esty Glen; Salmon Creek valley; Levanna (*D.* in C. U. Herb.); rather common about Union Springs; Junius; and elsewhere.

Native of Eurasia.

2. Ceanothus L.

1. **C. americanus** L. NEW JERSEY TEA.

Open woodlands and thickets, in the heavier sandy or gravelly acid soils; common. July.

Abundant in the sterile acid soils of the ravine crests of the basin and on the cliff crests along Cayuga Lake, and found also in many places on the more residual soils of the higher hills; absent in the pure clays and in the McLean district.

Cent. Me. to w. Ont. and Man., southw. to Fla. and Tex.; occasional or locally common on the Coastal Plain.

84. VITACEAE (GRAPE FAMILY)

a. Floral disk wanting; corolla expanding; leaves palmately compound. 1. PARTHENOCISSUS

a. Floral disk present, of 5 glands; corolla dropping without expanding; leaves simple. 2. VITIS

1. Parthenocissus Planch.[25]

a. Plant high-climbing; tendrils adhesive; leaves dull pale green, glaucescent beneath; cymes irregular, not dichotomous, panicled; fruit about 5–7 mm. in diam.; seeds 1–3.

b. Foliage glabrous. 1. *P. quinquefolia*

b. Foliage pubescent, at least when young. 1a. *P. q.*, var. *hirsuta*

a. Plant resting loosely on rocks, stumps, fences, and similar places; tendrils not adhesive; leaves deeper green, glossy above, green beneath; cymes dichotomous; fruit about 8–10 mm. in diam.; seeds 3–4.

b. Foliage glabrous. 2. *P. vitacea*

b. Foliage pubescent, at least when young. 2a. *P. v.*, var. *dubia*

1. **P. quinquefolia** (L.) Planch. (*Psedera quinquefolia* of Gray's Man., ed. 7. *Ampelopsis quinquefolia*, in part, of Cayuga Fl.) VIRGINIA CREEPER. WOODBINE.

Damp talus and low woods, in soils not too light; common. June 15–July.

Climbing up the cliffs in the ravines of the basin, and along the cliffs of Cayuga Lake, where it is very characteristic; also climbing trees in swamps and along river banks.

S. N. H. to Ill., southw. to Fla. and Mex., including the Atlantic Coastal Plain.

The adhesive part of the tendrils is not ordinarily dilated, as in the Boston ivy.

1a. **P. quinquefolia** (L.) Planch., var. **hirsuta** (Donn) Planch.

In situations similar to the preceding, and equally common. June 15–July.

Ont. and Vt. to Iowa, southw. w. of the Allegheny Mts. to N. Mex. and Mex.

This variety apparently passes into the typical form.

2. **P. vitacea** (Knerr) Hitchc. (*Psedera vitacea* of authors. *Ampelopsis quinquefolia*, in part, of Cayuga Fl.) VIRGINIA CREEPER. WOODBINE.

On fences, stumps, rocks, or banks, in rich soil which is not too dry; frequent, and generally distributed. June 15–July.

Cent. Me. to Alberta, southw. to Pa., Tex., and Colo.; less frequent or rare near the coast.

2a. **P. vitacea** (Knerr) Hitchc., var. **dubia** Rehder. (See Rhodora 10: 28. 1908.)

In situations similar to the preceding; frequent. June 15–July.

E. U. S.

Probably only a hairy extreme of the typical form.

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[25] Parthenocissus Planch. is included among the additions adopted at Brussels in 1910 to the *nomina conservanda* of the International Code.

2. **Vitis** (Tourn.) L.

a. Tendril or inflorescence normally opposite each leaf; leaf shallowly toothed, permanently uniformly and densely rusty-tomentose beneath; berries 12–20 mm. in diam. 1. *V. labrusca*

a. Tendrils and inflorescences intermittent, none opposite each third leaf; berries 6–12 mm. in diam.

b. Leaves shallowly dentate, glaucous and loosely rusty-tomentose or glabrate beneath; berries 8–12 mm. in diam. 2. *V. aestivalis*

b. Leaves coarsely and sharply dentate, green and nearly glabrous beneath, never tomentose; berries 6–10 mm. in diam. 3. *V. vulpina*

1. **V.** LABRUSCA L. NORTHERN FOX GRAPE.

Thickets, river banks, and similar situations, in rich damp soil; occasional. June 15–30.

Escaped from cultivation: Enfield Glen (*D.*); Ringwood (*D.!*); roadside one mile s. of Mecklenburg (*D.*); railroad near the glass works (*D.*); s. e. of Dryden Lake; roadside n. of Taughannock Gorge; and elsewhere.

Native: N. E. to Ind., southw. to Ga. and Tenn., mostly in the mts.; less frequent on the Coastal Plain.

2. **V. aestivalis** Michx. SUMMER OR PIGEON GRAPE.

Dry thickets, in rocky, sandy, or gravelly, not strongly calcareous, soils; common. June 15–July 10.

Especially abundant on the ravine slopes and shores of Cayuga Lake; occasional on the hills s. of Ithaca.

S. N. H. to Kans., southw. to Fla. and Tex.; fairly frequent on the Coastal Plain.

V. aestivalis Michx. and *V. bicolor* LeConte differ in degree of pubescence on the lower surface of the leaf. This difference is very indefinite, often slight and doubtfully important as a basis for nomenclatorial distinction. Plants in this flora are generally more or less pubescent.

3. **V. vulpina** L. (*V. riparia* of Cayuga Fl.) FROST GRAPE.

River banks and thickets, in gravelly or sandy nonacid soils; common. June.

In most of the ravines of the basin; Inlet Valley; about Indian Spring and Renwick woods; along the shores of Cayuga Lake and of most of its tributary streams. Characteristic of rich alluvial stream banks.

N. B. to Man., southw. to Fla., Tex., and Colo.; rare or absent on the Coastal Plain. A plant primarily of the rich soils of the interior.

A form with thicker leaves, more or less pubescent beneath, is frequent on the cliff talus along Cayuga Lake near Esty Glen.

85. TILIACEAE (LINDEN FAMILY)

1. **Tilia** (Tourn.) L.

a. Leaves glabrous except for tufts of hair in the axils of the veins. 1. *T. americana*

a. Leaves more or less stellate-pubescent beneath. 1a. *T. a.*, var. *heterophylla*

1. **T. americana** L. BASSWOOD. LINDEN.

Ravines and woodlands of many types, in nearly neutral soils, especially where the soil is heavy; frequent. July 12–30.

N. B. to Man., southw. to Ga. and Tex.; infrequent on the Coastal Plain.

The bract is variable as to base and petiole, being in some instances rounded at the base and very short-petioled, and in others tapering and long-petioled. The same

variations are found in var. *heterophylla*. The pubescence on the lower surface of the leaf is also highly variable, and on it several species have been founded. A large quantity of local material has been collected and this point studied, but no true specific lines have been found. The pubescence, though always close, fluctuates very gradually in density, and no other correlated structual characters occur. It seems better, therefore, to recognize this closely pubescent form simply as a variety.

1a. **T. americana** L., var. **heterophylla** (Vent.) Loudon.

Usually in lighter and drier soils than the preceding; frequent. July 12–30.

In the Cayuga Lake Basin, apparently confined to the ravine crests and hilltops s. of Ithaca.

More southern: Conn. to Wis., and southw.; rare or absent on the Coastal Plain.

This is T. Michauxii and T. heterophylla of Gray's Man., ed. 7, and T. heterophylla and its var. *Michauxii* of Sargent's treatment (see Bot. Gaz. 66: 421. 1918). Sargent's *T. neglecta* is transitional to typical *T. americana.*

86. MALVACEAE (MALLOW FAMILY)

a. Column of stamens anther-bearing only at top; carpels 10–20, separating from the central axis in fruit.
  b. Stigmas capitate; involucre[26] none; carpels 2–9-seeded, dehiscent; flowers yellow; leaves velvety. 1. ABUTILON
  b. Stigmas occupying the inner face of the styles; carpels 1-seeded, indehiscent; flowers white or pink; leaves not velvety.
    c. Involucre of 3 bracts. 2. MALVA
    c. Involucre of 6–9 bracts. 3. ALTHAEA
a. Column of stamens anther-bearing for a considerable part of its length, and 5-toothed at apex; carpels not separating from the axis; capsule 5-celled; stigmas capitate. 4. HIBISCUS

1. Abutilon (Tourn.) Mill.

1. **A.** THEOPHRASTI Medic. (*A. Avicennae* of Cayuga Fl.) VELVET-LEAF.

A weed in rich cultivated fields and waste places, in somewhat sandy soil; infrequent. Aug.–Oct.

Inlet Valley, near Strattons and near Lick Brook; Six Mile Creek (*D.*); Renwick flats, w. of the Inlet; near Coy Glen; Levanna to Union Springs.

Naturalized from India in all but the colder parts of N. A.

2. Malva (Tourn.) L.

a. Flowers axillary, fasçicled; leaves with shallow crenate lobes; petals four times as long as the calyx or less.
  b. Petals as long or twice as long as the calyx; leaves bluntly lobed.
    c. Stems procumbent; leaves obscurely lobed; plant biennial; carpels smooth. 1. *M. rotundifolia*
    c. Stems erect, tall; leaves more prominently 5–7-lobed, crisped; plant annual; carpels rugose. [*M. crispa*]
  b. Petals two to four times as long as the calyx; leaves sharply lobed; carpels rugose-reticulated. 2. *M. sylvestris*, var. *mauretiana*
a. Flowers clustered toward the ends of the branches; leaves deeply lobed; petals six to eight times as long as the calyx. 3. *M. moschata*

[26] The term *involucre* is apparently appropriate here, not the term *involucel* as employed in many texts.

. **M.** ROTUNDIFOLIA L. ROUND-LEAVED MALLOW. CHEESES.

A weed in various soils, chiefly in rich cultivated ground and waste places; common. une–Oct.

Native of Eurasia, and widely naturalized throughout all but the colder parts of '. A.

[**M.** CRISPA L.

Occasionally appearing as a weed in flower beds on C. U. campus and in waste laces in Ithaca, but evidently not established.

Adventive from Eu.]

. **M.** SYLVESTRIS L., var. MAURETIANA (L.) Boiss. (See Rhodora **12**: 140. 1910. *M. sylvestris* of Cayuga Fl.) HIGH MALLOW.

An occasional wayside escape from cultivation.

Near White Church (*D.*); near Ithaca (herb. C. Humphrey, *D.*); e. of Lake Como Locke Pond, *D.*).

Native of Eurasia; widely but sparingly escaped in e. N. A.

Dudley's specimen from White Church in the C. U. Herb. is var. *mauretiana*. 'his is the form usually found as an escape in the eastern U. S., and probably)udley's other specimens were of the same variety.

M. MOSCHATA L. MUSK MALLOW.

A weed in dry fields, on roadsides, and in waste places, in gravelly calcareous)ils; frequent. June 15–July 15.

Infrequent or rare about Ithaca, as near the athletic field, C. U. campus; fre- .ent or common in Enfield, Newfield, Dryden, and Groton, in localities where ie soil is suitable.

Newf. to B. C., southw. to n. N. J., Va., Wis., and Oreg.; most abundant north- ıstw. Naturalized from Europe.

Two color forms occur: pink and white.

3. Althaea L.

A. ROSEA Cav. HOLLYHOCK.

Mostly in heavy soils; occasional. July–Sept.

Escaped from cultivation: E. State St. and Bryant Tract, Ithaca; C. U. campus; ear Union Springs; and elsewhere.

Native of China.

4. Hibiscus L.

Petals 6–12 cm. long, rose color; leaves large, white-downy beneath, shallowly lobed or subentire; plant tall (1–2.5 m. high), perennial. 1. *H. Moscheutos*

Petals 2 cm. long, pale yellow with a dark eye; leaves small, not white-downy, at least the upper ones 3-parted and the divisions lobed; plant low, annual. 2. *H. Trionum*

H. Moscheutos L. (*H. palustris* L.) ROSE MALLOW. SWAMP HIBISCUS.

Silty alluvial marshland in the region of salt springs; frequent. Aug.

Marshes near foot of Cayuga Lake and on the Ontario plain: Union Springs, ear Farley Point (*D.*) and on Hibiscus Point (*D.*!); large area on a marshy land in Black Lake (*D.*); also elsewhere in the regions indicated; introduced near ie former biological field station, s. of Stewart Park.

E. Mass., along the coast to Fla. and La.; also in N. Y., *Ont.*, Ind., and Mo.

A very noble flower, strikingly large and beautiful.

2. **H.** TRIONUM L. FLOWER-OF-AN-HOUR.

A weed in rich gravelly cultivated fields and gardens, and on railroad banks, in calcareous districts; generally scarce but locally abundant. Aug.–Sept.

Inlet Valley, opposite Lick Brook, abundant; C. U. campus, near the Old Armory, 1884 (*D.*); *Forest Home*; *Renwick*; *near Esty Glen*; *field* near Crowbar Point, abundant in 1916; Taughannock Point; Levanna to Farley Point (*D.*!).

N. S. to S. Dak., southw. to Fla. and Kans. Native of s. Eu.

87. HYPERICACEAE (ST. JOHN'S-WORT FAMILY)

1. Hypericum (Tourn.) L.

a. Petals yellow, convolute in the bud.
  b. Styles 5; capsule 5-celled; petals 25 mm. long; leaves 4–9 cm. long. — 1. *H. Ascyron*
  b. Styles 3; capsule 3-celled; petals 2–15 mm. long; leaves 5 cm. long or less.
    c. Stamens very numerous; petals 5–15 mm. long.
      d. Petals 10–15 mm. long; leaves 1–2.5 cm. long. — 2. *H. perforatum*
      d. Petals 5 mm. long; leaves 2–5 cm. long. — 3. *H. punctatum*
    c. Stamens 5–12; petals 2–3 mm. long; plants smaller.
      d. Leaves scale-like or linear-subulate. — 4. *H. gentianoides*
      d. Leaves linear to ovate, foliaceous.
        e. Branching diffuse; leaves ovate or oval. — 5. *H. mutilum*
        e. Branching strict, erect; leaves lanceolate to linear.
          f. Leaves lanceolate, acutish, rounded, or subcordate, and clasping at the base, 5–7-nerved; sepals 5–7 mm. long, nearly equaling the pod. — 6. *H. majus*
          f. Leaves linear, spatulate, obtuse, attenuate at the base, 1–3-nerved; sepals 2.5–5 mm. long, much shorter than the pod. [*H. canadense*]
a. Petals purplish flesh-color, imbricated in the bud; leaves ovate-oval. — 7. *H. virginicum*

1. **H. Ascyron** L. GREAT ST. JOHN'S-WORT.

Damp alluvial river banks in rich soil or on gravel bars, in limy regions (?); scarce. July 15–30.

Apparently confined to Cascadilla and Fall Creeks: above Judd Falls (*D.*); head of Eddy Pond (*D.*); below Genung's mill (*D.*); opposite Cascadilla Place (*D.*); Fall Creek, near Varna, 1871 (*Dr. Jordan*!); island at Forest Home; below the lower bridge in Forest Home; Beebe Lake (*D.*); behind Sibley College; Renwick woods (*D.*!).

W. Que. to Man., southw. through Vt. and N. Y. to Pa., Ill., Mo., and Kans. A plant primarily of the richer soils of the Mississippi Basin.

2. **H.** PERFORATUM L. COMMON ST. JOHN'S-WORT.

A weed in dry sandy or gravelly grassy fields, on roadsides, and in waste places, in run-out acid or neutral soils; very common, and generally distributed. July–Aug.

Widely naturalized in N. A. Native of Eu.

3. **H. punctatum** Lam. (*H. maculatum* of Cayuga Fl.)

Chiefly in moist places along paths, fence rows, and open woods, in rich gravelly or loamy acid or neutral soils; frequent, and generally distributed. July–Aug.

E. Que. to Minn., southw. to Fla., Kans., and Tex.; much less common on the Coastal Plain.

4. **H.** GENTIANOIDES (L.) BSP.

Dry sterile gravelly soil; rare. Aug.–Sept. 15.

Found in *1921* in considerable abundance in a field n. of South *Hill* Marsh (*W. C. Muenscher*), still persisting in 1925 and apparently established.

Native: Me. to Fla. and Tex., and s. w. Ont. to Ill. and La.

5. **H. mutilum** L.

Ditches, exsiccated places, and shores, in a great variety of soils both light and heavy, sometimes in acid sands, at other times near marl bogs, or in acid sphagnum; common. July–Sept.

N. S. *to* Man., *southw. to* Fla., Kans., *and* Tex., *including the* Coastal *Plain.*

A form with cream-colored flowers occurs w. of Freeville.

6. **H. majus** (Gray) Britton. (*H. canadense*, var. *major*, of Cayuga Fl.)

Sandy or gravelly shores or marshes, in calcareous or noncalcareous soils; rare. Aug.

Spencer Lake; Summit Marsh (*D.*!); Goodwin (Taughannock) Point (*D.*!); rarely on the Montezuma Marshes (*D.*).

E. Que. *to* Man., *southw.* to L. I., *n.* N. J., Pa., Ill., Iowa, *and* S. Dak.; *also* e. Wash.; infrequent on the Coastal Plain.

[**H. canadense** L.

Reported from Summit Marsh by Dudley. A specimen in the C. U. Herb. collected and so labeled by Dudley is an extreme of the preceding species.]

7. **H. virginicum** L. (*Elodea campanulata* of Cayuga Fl. *Elodes* of authors.) PURPLE ST. JOHN'S-WORT.

In acid boggy soil; frequent. Aug.

"In sphagnum and other marshes; frequent" (*D.*). Summit Marsh; Dryden Lake; Mud Pond, McLean Bogs; moor of Junius peat bogs; and elsewhere.

Newf. to Man., southw. to Fla., La., and Nebr.; common on the Coastal Plain. Found also in n. e. Asia.

88. CISTACEAE (ROCKROSE FAMILY)

a. Petals 5, fugacious, large and showy in the larger flowers; leaves pale-tomentose beneath, stellate-puberulent above. 1. HELIANTHEMUM

a. Petals 3, withering-persistent, minute; leaves not tomentose beneath. 2. LECHEA

1. Helianthemum (Tourn.) Mill.

a. Larger flowers 5–12 in a short terminal cymose raceme, each 1.5–2.5 cm. in diam., pale yellow, with capsules 3–5 mm. in diam. and the calyx crisp-puberulent, canescent; these flowers little if at all overtopped by the later branches; capsules of the smaller flowers uniform, about 2 mm. in diam.; seeds reticulated. 1. *H. Bicknellii*

a. Larger flowers solitary or rarely 2, 2–4 cm. in diam., bright yellow, with capsules 6–9 mm. in diam. and the calyx pilose; these flowers soon conspicuously overtopped by the branches and becoming lateral; capsules of the smaller flowers of two sizes, the terminal ones 3–4 mm. in diam., the lateral ones much smaller; seeds papillose. 2. *H. canadense*

1. **H. Bicknellii** Fernald. (See Rhodora 21: 36. 1919. *H. majus* of authors. *H. canadense*, in part, of Cayuga Fl.) FROSTWEED.

Dry sandy or gravelly banks, in acid soils; scarce. June 20–July.

Valley Cemetery, s. of Ithaca (*D.* and in C. U. Herb.); Buttermilk Glen (*D.* and in C. U. Herb.); Coy Glen, crest of lower ravine, n. side; sandy crest of Salmon Creek ravine, e. of Five Corners.

N. S. to Minn., southw. to S. C., Tex., and Colo.; common on the Coastal Plain.

2. **H. canadense** (L.) Michx. FROSTWEED.

In situations similar to the preceding; rare. June–July.

Junius, sandy wooded banks e. of Lowery Ponds and e. of Pout Pond.

Me. to Wis., southw. to N. C. and Miss.; common on the Coastal Plain.

2. Lechea (Kalm) L.

1. **L. intermedia** Leggett. (*L. thymifolia* of Cayuga Fl.) PINWEED.

Dry gravelly soils; rare. July–Sept.

Reported from dry soil, n. side of Salmon Creek ravine, by Dudley as *L. thymifolia*, but Dudley's specimen in the C. U. Herb. from this locality is *L. intermedia* Leggett.

N. B. and N. S. to Wis., southw. to Pa., including the northern Coastal Plain.

89. VIOLACEAE (VIOLET FAMILY)

a. Flowers greenish; sepals not auricled; stamens fused, with a gland on the lower side; plants tall, leafy. 1. HYBANTHUS

a. Flowers white or colored; sepals auricled; corolla more irregular; stamens distinct or slightly coherent, the lower two spurred; plants low. 2. VIOLA

1. Hybanthus Jacq.

1. **H. concolor** (Forst.) Spreng. (*Ionidium concolor* of Cayuga Fl.) GREEN VIOLET.

Damp banks and thickets, in rich gravelly or rocky calcareous soils; scarce. May 15–June 10.

Enfield Glen, near foot of talus, n. side; Six Mile Creek, e. of Sulphur Spring, formerly (*D.*); ravine at Crowbar Point; Salmon Creek, n. side below Ludlowville (*D.*!) and also on flats in the ravine s. of Genoa; "woods, Ledyard," 1827 (Herb. J. J. Thomas, *D.*); Paine Creek; Big Gully.

N. N. Y. to Mich., southw. to N. C. and Kans. A plant of the rich limy soils of the Ohio Valley region.

2. Viola (Tourn.) L.

Key to species based on petaliferous flowers

a. Plants stemless; leaves and scapes all from rootstocks or runners. (2d *a*, p. 303.)
  b. Rootstocks stout, (2.5) 3–10 mm. in diam., short.
    c. Flowers blue, rarely white; style beaked at summit in front.
      d. Leaves cordate-reniform or cordate-ovate in general outline, smooth or hairy.
        e. Beard, or a part of it, usually of strongly clavate hairs; sepals narrow, often ciliate-serrulate toward the apex; flowers generally with a dark eye, on peduncles much exceeding the leaves; spurred petal shorter than the lateral petals, glabrous; (leaves inconspicuously crenate, nearly or quite glabrous). 1. *V. cucullata*
        e. Beard of cylindrical or only slightly clavate hairs; sepals entire toward the apex; flowers without a dark eye, on peduncles usually equaling or shorter than the leaves; spurred petal as long as the lateral petals, glabrous or hairy.
          f. Leaves practically glabrous, not ciliate, undivided; spurred petal villous.
            g. Leaf blades of the later leaves ovate, strongly toothed; petioles and peduncles smooth. 2. *V. affinis*
            g. Leaf blades reniform, less strongly toothed; petioles and peduncles granulose along the upper part. 3. *V. latiuscula*

f. Leaves hairy or rarely glabrous, ciliate, often lobed or divided; spurred petal glabrous or hairy.
g. Spurred petal villous; leaf blades deltoid-ovate, rather small; petioles slender, slightly hairy above. 4. *V. septentrionalis*
g. Spurred petal glabrous; leaf blades more dilated, larger.
h. Leaves lobed or parted, rarely unlobed, scarcely bullate; petioles slender, densely villous to the base. 5. *V. palmata*
h. Leaves unlobed, more bullate; petioles generally villous above, less so toward the base, occasionally in shade entirely glabrous. 6. *V. sororia*
d. Leaves ovate-oblong, truncate or subcordate at base, blunt at apex, short-petioled, hairy. 7. *V. sagittata*, var. *ovata*
c. Flowers yellow; style beakless. 8. *V. rotundifolia*
b. Rootstocks slender, rarely wanting, 2–4 mm. in diam. near the summit, 1–1.5 mm. in diam. farther back, often long and creeping.
c. Style clavate, beaked at summit in front; flowers of medium size or rather small.
d. Spur one-half to two-thirds as long as the limb, subclavate; flowers light blue, scentless (?); leaves with a deep basal sinus, the lobes converging and often overlapping; blades thin, coarsely and flatly crenate-serrate, setose above, glabrous beneath. 9. *V. Selkirkii*
d. Spur one-fourth as long as the limb or less, not clavate; flowers white, sweet-scented; leaves with the basal sinus less deep, open; blades less coarsely crenate, glabrous or hairy.
e. Leaves reniform or ovate-reniform, usually pointed, generally dull; pubescence, if any, fine.
f. Leaves entirely glabrous, generally small, usually much exceeded by the scapes; upper petals broadly obovate, the lateral ones usually beardless. 10. *V. pallens*
f. Leaves more or less hairy, larger, rarely exceeded by the scapes; petals and beard various.
g. Blades slightly fleshy, glabrous except for a few hairs above; petioles and peduncles usually reddish, the former spreading; flowers rather large; upper petals narrow, lateral ones beardless. 11. *V. blanda*
g. Blades thinner, more veiny; petioles and peduncles not reddish, the former rather erect; flowers smaller; upper petals broad, lateral ones bearded.
h. Leaves hairy below and on the petioles. 12. *V. incognita*
h. Leaves hairy above, glabrous below and on the petioles. 12a. *V. incognita*, var. *Forbesii*
e. Leaves orbicular-reniform, generally pointless, waxy-glossy, glabrous at least above; pubescence, if present, coarse; lateral petals beardless. 13. *V. renifolia*, var. *Brainerdii*
c. Style scarcely enlarged above, hooked; flowers large, sweet-scented, blue or white; (spurs rather short; leaves obtuse, usually velvety on both surfaces). 14. *V. odorata*
a. Plants leafy-stemmed; flowers axillary.
b. Style not enlarged, or merely capitate; stipules entire or toothed.
c. Style capitate, beakless, bearded near the summit; spur short; stipules nearly or quite entire.
d. Petals yellow; stipules ovate, subherbaceous; leaves coarsely crenate.
e. Plant very pubescent; root leaves usually wanting; cauline leaves strongly veiny; stipules broadly ovate; capsules often woolly. 15. *V. pubescens*

e. Plant sparingly pubescent; root leaves usually 1–3; cauline leaves less veiny than in the preceding species; stipules narrowly ovate.
f. Ovary more or less woolly. 16. *V. eriocarpa*
f. Ovary glabrous. 16a. *V. eriocarpa*, var. *leiocarpa*
d. Petals white within, violet without; stipules lanceolate, whitish, thin and scarious; leaves finely toothed, more sharply acuminate. 17. *V. canadensis*
c. Style not capitate, beaked or beakless, glabrous or bearded; spur longer; stipules bristly-toothed, herbaceous.
d. Spur 4–9 mm. long; lateral petals bearded; style bent at the tip, with a short beard.
e. Petals white or cream-colored; leaves thin, veiny, with rounded crenations; stipules (1) 1.5–2.5 cm. long, toothed throughout. 18. *V. striata*
e. Petals lavender or violet; leaves thicker, less veiny, with flattened crenations; stipules 0.1–1.3 cm. long, toothed mostly toward the base. 19. *V. conspersa*
d. Spur 9–13 mm. long; lateral petals beardless; style straight and smooth; (leaves and stipules as in the preceding species, but the upper aestival leaves narrower and more pointed). 20. *V. rostrata*
b. Style much enlarged upward into a globose hollow summit; stipules large, leaf-like, pectinate at base, the terminal lobe enlarged. 21. *V. arvensis*

Key to species based on cleistogamous flowers and fruit

a. Plant stemless; leaves and scapes all from rootstocks or runners. (2d *a*, p. 306.)
b. Rootstocks stout, (2.5) 3–10 mm. in diam., short; runners wanting (or forming a raceme of flowers in no. 8). (2d *b*, p. 305.)
c. Cleistogamous flowers borne singly on the rootstocks; leaves not oval and thick or waxy.
d. Leaves in general outline cordate-reniform or cordate-ovate, the later ones apiculate, long-petioled, smooth or hairy.
e. Cleistogamous flowers sagittate-lanceolate; capsules on erect peduncles, oblong, green, 10–15 mm. long; sepals nearly as long, narrow, often ciliolate at apex, the auricles 2–4 mm. long, lobed; (seeds small, 1.4 mm. long, black; leaves glabrous or usually so, the blade acute but scarcely apiculate, deltoid-reniform, scarcely bullate, inconspicuously crenate). 1. *V. cucullata*
e. Cleistogamous flowers more ovoid; capsules oval or oblong-oval, usually tinged with purple; sepals generally much shorter than the capsules, oblong-lanceolate, the apex entire, the auricles 0.5–2 mm. long, entire or slightly lobed.
f. Leaves glabrous, undivided, not ciliate; (petioles slender; auricles of the sepals appressed; seeds 1.6–1.8 mm. long).
g. Leaf blades triangular-ovate; petioles smooth; capsules 4–7 mm. long, glabrous or pubescent, on erect peduncles; seeds buff. 2. *V. affinis*
g. Leaf blades very broadly flat-reniform, apiculate; upper part of petioles granular-roughened; capsules 6–10 mm. long, glabrous, on prostrate peduncles; seeds dark brown. 3. *V. latiuscula*
f. Leaves more or less hairy, rarely glabrous, undivided or deeply parted, ciliolate.
g. Sepals with spreading, toothed auricles; capsules on erect peduncles; seeds dark brown, 1.7–1.8 mm. long; (capsules subglobose or oval, 8–12 mm. long; leaves deltoid-ovate, scarcely bullate, bluish green; petioles slender, slightly hairy above). 4. *V. septentrionalis*

g. Sepals with appressed, subentire auricles; capsules on prostrate peduncles; seeds brown, 1.9–2.1 mm. long.

h. Leaves broadly flat-reniform to ovate, lobed or parted, or more rarely unlobed and shallowly toothed, scarcely bullate, bluish green; petioles slender, densely villous to the base; capsules oval, 7–12 mm. long.

i. Leaves ovate. 5. *V. palmata*

i. Leaves subreniform, abruptly acute. 5a. *V. palmata*, var. *dilatata*

h. Leaves round-reniform-cordate, unlobed, with more rounded, fuller, and less distant teeth than in no. 5, bullate, bright green; petioles tall and stout, villous above, rarely glabrous, less villous or glabrate at base; capsules oblong-oval, 8–14 mm. long. 6. *V. sororia*

d. Leaves ovate-oblong, truncate or subcordate at base, blunt at apex, short-petioled, hairy. 7. *V. sagittata*, var. *ovata*

c. Cleistogamous flowers several, on short, nearly leafless runners simulating a raceme; leaves large, oval-oblong, obtuse, thick or waxy, dull, low-crenate, prostrate; capsules 6–8 mm. long, purple-flecked; seeds mostly white (?). 8. *V. rotundifolia*

b. Rootstocks slender, rarely wanting, 2–4 mm. in diam. near the summit, 1–1.5 mm. in diam. farther back, often rather long and creeping; plant with or rarely without runners either above or below ground.

c. Runners nearly filiform, subterranean, superficial, or rarely wanting, leafless or with reduced leaves; capsules glabrous; auricles of the sepals subappressed.

d. Basal sinus of leaf deep, the lobes converging and often overlapping, the blade thin, coarsely and flatly crenate; (leaves sparsely setose above, glabrous below; capsule usually purple-flecked; seeds 1.2–2 mm. long, pale buff). 9. *V. Selkirkii*

d. Basal sinus of leaf open, the blade thicker, less coarsely crenate.

e. Capsules ellipsoidal, green; seeds ovoid, acute at base, 1 mm. long, black; leaves glabrous, generally obtuse and rounded; (runners often bearing flowers and reduced leaves). 10. *V. pallens*

e. Capsules ovoid, usually purplish; seeds larger; leaves with at least a few hairs, apiculate or obtuse.

f. Runners filiform, flowerless; leaves dull, apiculate; pubescence fine.

g. Leaf blades slightly fleshy, glabrous except for a few hairs above; petioles usually reddish, spreading; runners usually with leaves; seeds ovoid, acute at base, 1.2–1.6 mm. long, black. 11. *V. blanda*

g. Leaf blades thinner, more veiny; petioles not reddish, more erect; runners usually nearly or quite leafless; seeds oblong, blunt at base, 1.6–1.9 mm. long, brown.

h. Leaves hairy below and on the petioles. 12. *V. incognita*

h. Leaves hairy above, glabrous below and on the petioles. 12a. *V. incognita*, var. *Forbesii*

f. Runners short, raceme-like, flower-bearing, sometimes wanting; leaves rounded, pointless, waxy-glossy, glabrous at least above; pubescence, if present, coarse; seeds as in the last preceding species. 13. *V. renifolia*, var. *Brainerdii*

c. Runners long and coarse, above ground, leafy; capsules pubescent; auricles of the sepals usually spreading; (leaves obtuse, finely crenate, usually velvety on both surfaces; seeds large, pale). 14. *V. odorata*

a. Plant leafy-stemmed; petaliferous and cleistogamous flowers axillary to the cauline leaves.
b. Stipules not leaf-like, either entire, toothed, or laciniate.
c. Stipules entire or nearly so.
d. Stipules ovate-lanceolate or oblong, scarcely scarious; upper leaves strongly veined, broadly ovate; basal leaves with the blade at insertion of the petiole flabelliform; capsule hairy or glabrous, 9–14 mm. long or an occasional one shorter.
e. Plant very pubescent; root leaves usually wanting, cauline leaves very strongly veiny; stipules broadly ovate; capsule glabrous, or sometimes woolly. 15. *V. pubescens*
e. Plant sparingly pubescent; root leaves usually 1–3, cauline leaves less veiny than in the preceding species; stipules narrowly ovate.
f. Capsule woolly. 16. *V. eriocarpa*
f. Capsule glabrous. 16a. *V. eriocarpa*, var. *leiocarpa*
d. Stipules linear-lanceolate, scarious; upper leaves lightly veiny, more narrowly ovate and more strongly acuminate than in the preceding species; basal leaves with the blade scarcely flabelliform; capsule generally puberulent, 4–6 mm. long. 17. *V. canadensis*
c. Stipules bristly-toothed, herbaceous; capsules glabrous.
d. Leaves thin, veiny, with rounded crenations; stipules (1) 1.5–2.5 cm. long, toothed throughout; auricles of the sepals about 2 mm. long; seeds about 2 mm. long. 18. *V. striata*
d. Leaves thicker, less veiny, with flattened crenations; stipules 0.5–1.3 cm. long or an occasional one longer, toothed mostly toward the base; auricles of the sepals about 1 mm. long; seeds 1.5–1.8 mm. long.
e. Upper leaves ovate-reniform, bluntly acute or subapiculate. 19. *V. conspersa*
e. Upper leaves narrower and more pointed. 20. *V. rostrata*
b. Stipules large, leaf-like, pectinate at base, the terminal lobe enlarged. 21. *V. arvensis*

1. **V. cucullata** Ait. MARSH BLUE VIOLET.

Springy and boggy meadows and woodlands, in both acid and calcareous soils; common. May 10–June 10; cleist. June 15–July 15.

Very generally distributed throughout the basin in the situations indicated; less abundant in calcareous soils; absent on the Renwick and Cayuga Marshes (?).

Newf. and Que. to Ont., southw. in the mts. to Ga.; common in granitic N. E. and on the Coastal Plain.

Ordinarily not difficult to recognize, but sometimes the petioles become villous or the beard less knobbed. Such specimens may be of hybrid origin.

2. **V. affinis** LeConte.

Moist alluvial bottom-land woods, meadows, or pastures; rare. May 15–June 10; cleist. June 15–July 15.

Cayuga Marshes (*K. M. W., A. J. E., & L. F. Randolph*); near Mud Pond, Conquest.

W. N. E. to Wis., southw. to Ga. and Ala.; infrequent or rare on the Coastal Plain.

The distribution of this species in the Cayuga Lake Basin is not understood, and it is probably more common than the above statement would indicate. Specimens under the poplars at Mud Pond, McLean Bogs, resemble this species but differ in some particulars.

[**V. nephrophylla** Greene. NORTHERN BOG VIOLET.

House (Bul. N. Y. State Mus. 254, 1924) lists this species from Tompkins Co. Extended search has not revealed it to the authors.]

3. **V. latiuscula** Greene. BROAD-LEAVED BLUE VIOLET.

Dry open woods and banks, mostly in sandy or gravelly neutral soils; infrequent. May 15–June 10; cleist. July 15–Sept. 10.

Thatcher Pinnacles; Caroline Pinnacles; n. side of Six Mile Creek, near Amphitheater; woods n. side of Fall Creek, below Varna; Renwick slope; n. e. of Hanshaw Corners; near Wyckoff Swamp; Ludlowville; Junius.

W. Vt. to N. Y., southw. to Conn., n. N. J., and Pa.

In summer the broad, short blades, which are unevenly ciliate, and the rather slender, rough but not hairy, usually purple-based petioles, are characteristic. The capsules are more like those of *V. palmata* and not so large as in *V. sororia*. Hybrids with other species are frequent. Some specimens are very difficult to distinguish from *V. palmata*, var. *dilatata*, and may be glabrate, entire-leaved forms of that variety.

4. **V. septentrionalis** Greene. NORTHERN BLUE VIOLET.

Dry or damp roadsides, pastures, and the borders of woods, in gravelly calcareous or noncalcareous soils; frequent. May; cleist. June 15–July.

P. E. I. to Ont., southw. to Conn. and n. Pa.

5. **V. palmata** L. (*V. cucullata*, var. *palmata*, of Cayuga Fl.) PALMATE VIOLET.

Dry rich woodlands or scrubby and grassy banks, in sandy or gravelly, nearly neutral, soils, or in light soils mixed with some clay; frequent. May; cleist. June 20–July.

In the more neutral gravels about Ithaca, on the stony soils along Cayuga Lake, and at a few stations in the clay region, as n. e. of Hanshaw Corners and w. of Asbury, also occasionally in sandy woods on the Ontario plain. Rarely recorded from the ericaceous and chestnut soils s. of Ithaca, and not recorded from the McLean region.

W. Mass. to Minn., southw. along the mts. to Fla.; infrequent on the Coastal Plain.

Hybrids between this species and *V. sororia* or *V. latiuscula* are apparently common. Thus, in a woodland just north of Esty Glen, and elsewhere, *V. palmata* var. *dilatata* and *V. sororia* occur, and with them numerous plants showing combinations of the characters of the two parents. In an open woodland northeast of Hanshaw Corners, *V. palmata*, its var. *dilatata*, and *V. latiuscula* occur. Here there are dozens of plants showing combinations of the characters of these two species. In these hybrids the glabrous character of *V. latiuscula* is more or less dominant, while the roughness of its petioles is almost entirely absent. Typical *V. palmata* is not extremely stout, and has rather slender purple-based villous petioles, palmately lobed dull-green ciliate villous blades, and short capsules.

5a. **V. palmata** L., var. **dilatata** Ell. (Including *V. triloba* Schwein.?)

In situations similar to the preceding; occasional.

Six Mile Creek, n. side near reservoir; Fall Creek, below Varna; Hanshaw Corners; n. of Esty Glen; Glenwood Road.

Range not known.

The relation of this variety to *V. latiuscula* and *V. sororia* is not clear. Near most of the stations were plants of *V. latiuscula* and also hybrids of *V. latiuscula* or *V. sororia* with *V. palmata*. The leaves of both typical *V. palmata* and its var. *dilatata* are occasionally unlobed, but this condition is more frequent in var. *dilatata*.

6. **V. sororia** Willd. (*V. cucullata*, in part, of Cayuga Fl.) MEADOW BLUE VIOLET.

Damp grassy roadsides, woodlands, fields, and along brooks, in rich alluvial or loamy soils; common. May; cleist. June 25–Sept. 10.

Widely distributed throughout the basin in the proper soils; abundant on the bottom lands in the ravines, and in Renwick woods.

Mass. to Minn., southw. to N. C. and Okla.; infrequent on the Coastal Plain.

In this region it has been impossible to distinguish any form answering to *V. papilionacea*. This may be a good species on the Coastal Plain, but certainly in central N. Y. it cannot be separated from *V. sororia*. This latter species hybridizes frequently with *V. palmata*, and probably with other species. Normal *V. sororia* is coarse and tall in summer, with large, full, green, bullate leaves, rounded crenations, and stout green petioles which are hairy above. The capsules are large and longer than in *V. palmata*, and may be either green or purple. In the more rounded crenations of the leaves it differs from *V. palmata*, *V. cucullata*, and *V. septentrionalis*.

7. **V. sagittata** Ait., var. **ovata** (Nutt.) T. & G. (*V. ovata* of authors. *V. fimbriatula* Smith.) OVATE-LEAVED BLUE VIOLET.

Dry pastures and banks, in sandy or gravelly acid soils; infrequent. May; cleist. July–Aug.

Frequent in the chestnut-vaccinium soils of the hills s. and s. e. of Ithaca; absent elsewhere, with the exception of the last station noted below: hilltops n. w. of North Spencer; hill e. of Summit Marsh (*D.*!); Thatcher Pinnacles (*D.*!); Danby, s. e. of village (*D.*); Caroline Pinnacles (*D.*!); near Key Hill; South Hill, near survey station 420 (*D.*!); near Buttermilk Glen (*D.*!); Cayuga Heights, along the old street railway grade.

N. S. to Wis., southw. to the mts. of Ga.; common on the northern Coastal Plain.

This variety grades into the typical form of *V. sagittata* in such a way that no species line can be drawn between them.

8. **V. rotundifolia** Michx. STEMLESS YELLOW VIOLET.

Damp rich woodlands and banks, in gravelly or loamy calcareous soils; frequent. Apr. 15–May 10; cleist. July–Sept.

Confined mostly to the cool woods of the higher hills, coming down toward Ithaca on the shaded south ravine slopes: North Spencer; near Bald Hill, Caroline; Buttermilk Glen (*D.*); Lick Brook (*D.*); Six Mile Creek (*D.*!); Snyder Hill; Dart Woods (*D.*); Mud Creek Swamp; around Woodwardia Bog; woods, McLean Bogs; Wyckoff Swamp. Absent on the ericaceous-chestnut soils.

Me. to w. Ont., southw. along the mts. to n. Ga.; rare on the Coastal Plain.

9. **V. Selkirkii** Pursh. GREAT-SPURRED VIOLET.

Damp rich humus and on rotting logs in deep woods at the foot of slopes, especially under hemlocks, in limy regions; frequent. Apr. 15–May 15; cleist. July–Aug.

Enfield Glen, s. side below main falls (*D.*!) and near the lower end; ravine n. of Buttermilk Glen (*C. M. Doyle*!); hilltop n. of Caroline; around Woodwardia Bog; McLean Bogs, various localities s. and w. of Mud Pond; around Chicago Bog; Salmon Creek ravine, s. of Genoa; and elsewhere.

Greenland and N. B. to Minn., southw. to Pa.

10. **V. pallens** (Banks) Brainerd. (*V. blanda*, in part, of Cayuga Fl.) WHITE VIOLET.

Springy and boggy meadows and the borders of swamps, in calcareous or noncalcareous soils; common, and generally distributed. May–June 10; cleist. June 15–July.

Lab. to Alberta, southw. to S. C., Tenn., and Colo.; common in N. E. and on some parts of the Coastal Plain.

11. **V. blanda** Willd. (*V. blanda*, in part, of Cayuga Fl.) WHITE VIOLET.

Humus in rich, chiefly dry, woodlands and ravines; frequent. May; cleist. June–July.

Generally distributed where the humus is abundant except on the ericaceous-chestnut soils of the basin, where it is absent.

W. Que. and w. N. E. to Minn., southw. in the mts. to Ga.; rare or absent on the Coastal Plain.

12. **V. incognita** Brainerd. (*V. blanda*, in part, of Cayuga Fl.) WHITE VIOLET.

Low or damp woodlands, especially under conifers, occasionally on ledges in ravines, in calcareous or noncalcareous, mostly gravelly, soils; frequent, and generally distributed. May; cleist. June 15–July.

Lab. to N. Dak., southw. to the mts. of e. Tenn.; infrequent on the Coastal Plain.

12a. **V. incognita** Brainerd, var. **Forbesii** Brainerd. (See Bul. Torr. Bot. Club **38**: 8. 1911.)

In situations similar to the preceding; frequent, and generally distributed.

Que. to Wis., southw. to Mass. and Tenn.

13. **V. renifolia** Gray, var. **Brainerdii** Fernald. (See Rhodora **14**: 86. 1912.) WHITE VIOLET.

Humus in damp woodlands and ravines, in calcareous regions; frequent. May; cleist. June 20–Aug. 15.

S. of Caroline Depot; Dry Run, Spencer; Newfield Creek, above Newfield; Bull Hill; Enfield Glen; Michigan Hollow Swamp; ravine n. of Buttermilk Glen; Coy Glen; Ringwood; Malloryville Bog; s. e. corner of Dryden; Beaver Brook; McLean Bogs; Townley Swamp; Salmon Creek, e. of Genoa; and elsewhere.

Lab. to Alaska, southw. to Pa. and Mich.

14. V. ODORATA L. ENGLISH VIOLET.

An occasional escape from gardens and lawns to roadsides and banks. Apr. 15; cleist. summer.

Seneca St., near Spring St. (*D.*); Forest Home, bank of creek below first bridge (*A. R. Bechtel*); and elsewhere (*D.*).

Native of Eu.

15. **V. pubescens** Ait. (*V. pubescens*, var. *eriocarpa*, mainly, of Cayuga Fl.) STEMMED YELLOW VIOLET.

Dry or damp woodlands, in rich gravelly, loamy, or alluvial, nonacid soils; frequent. May; cleist. summer.

S. of Caroline Depot; Newfield; South Hill; near Coy Glen; near Malloryville Bog; Renwick slope; Glenwood Road; near Jacksonville; Mecklenburg; near Ludlowville; n. of Levanna; s. w. corner of Cato; and elsewhere.

N. S. to N. Dak., southw. especially in the mts. to Va. and Mo.; rare on the Coastal Plain.

The separation of *V. pubescens* and *V. eriocarpa* is difficult here as elsewhere (see Bul. Torr. Bot. Club **38**: 194. 1911). None of the characters given in the keys are constant. In general, *V. pubescens* is stouter than *V. eriocarpa* and has a different appearance. Northern *V. pubescens* seems to have larger seeds (2.6–3 mm. long) than southern *V. eriocarpa* (2.2–2.5 mm. long), but at Ithaca there is no correlation between the size of seeds and other characters. To what extent the mixture of characters here is due to hybridization has not been determined.

16. **V. eriocarpa** Schwein.* (See Bul. Torr. Bot. Club **38**: 194. 1911. *V. scabriuscula*, in part, of authors. *V. pubescens*, in part, of Cayuga Fl.) STEMMED YELLOW VIOLET.

In situations similar to the preceding, but in damper and somewhat heavier soils; frequent. May; cleist. summer.

Beech Woods, Six Mile Creek; Ringwood; Mud Creek, Freeville; woods, McLean Bogs; Wyckoff Swamp; Bear Swamp; Duck Lake; and elsewhere.

Conn. and s. Ont. to Minn., southw. to Md. and Okla.; apparently rare on the Coastal Plain.

Flowering one to two weeks earlier than the last preceding species. It is unfortunate that Schweinitz's type was of the form with woolly capsules, which is less common.

16a. **V. eriocarpa** Schwein., var. **leiocarpa** Fernald & Wiegand. (See Rhodora 23: 275. 1921. *V. scabriuscula*, in part, of authors. *V. pubescens*, in part, of Cayuga Fl.)

In situations similar to the preceding; common. May; cleist. summer.

N. S. and Que. to Minn., southw. to N. C. and Mo.

17. **V. canadensis** L. CANADA VIOLET.

Dry or damp rich gravelly woodlands, in calcareous soils with much humus; frequent. May–July.

Rare or absent on the ericaceous-chestnut soils of the basin, and on the clays; elsewhere general, especially in the ravines and in the McLean region.

N. B. to Sask., southw. to S. C., Ala., Nebr., and in the Rocky Mts. to Ariz. and N. Mex.; rare or absent on the Coastal Plain.

18. **V. striata** Ait. CREAMY VIOLET.

Alluvial stream banks and low alluvial woodlands, in calcareous regions; infrequent. May–June 15.

Negundo Woods (*D.*); Renwick woods; Amphitheater, Six Mile Creek (*D.!*); McGowan Woods; Fall Creek, between Forest Home and Varna, abundant; woods of Freeville and the McLean Bogs (*D.*); Fir Tree Swamp, Freeville; Taughannock Gorge (*D.!*); Salmon Creek, above Ludlowville.

N. Y. to Minn., southw. to Ga. and Mo.; rare or absent on the Coastal Plain.

19. **V. conspersa** Reich. (*V. canina*, var. *sylvestris*, of Cayuga Fl.) DOG VIOLET.

Damp banks and the borders of low woods, in gravelly or sandy, alluvial, loamy, neutral, rather sterile soils; common. May; cleist. summer.

General throughout the basin, except in the acid soils and clays.

E. Que. to Minn., southw. to Ga.; infrequent on the Coastal Plain.

20. **V. rostrata** Pursh. LONG-SPURRED VIOLET.

Damp or rather dry banks and open woods, in gravelly, more or less calcareous, soils; frequent, or locally common. May; cleist. summer.

Rare or absent on the ericaceous-chestnut soils of the basin; otherwise general in the proper situations.

W. Que. to Mich., southw. in the mts. to Ga.; mostly absent from the Coastal Plain.

White-flowered plants are occasional, as in lower Enfield Glen (forma *Phelpsiae* Fernald, Rhodora 17: 180. 1915).

21. **V. ARVENSIS** Murr. FIELD PANSY.

A weed in old sandy or gravelly, often loamy, fields, not primarily in acid soils; rare. July–Sept.

Buttermilk Glen, field on top of hill s. side of upper glen, 1916; Etna, corner state and Ringwood roads, 1922 (*W. E. Manning*); Lansing station, 1925.

Newf. and Ont., southw. to N. C. Adventive from Eu.

90. THYMELAEACEAE (MEZEREUM FAMILY)

a. Calyx lobes almost wanting; stamens and style exserted; flowers pale yellow. 1. DIRCA
a. Calyx lobes prominent, spreading; stamens and style included; flowers purple. 2. DAPHNE

1. Dirca L.

1. **D. palustris** L. LEATHER-WOOD.

Damp or rich woods, in gravelly calcareous soils; frequent. Apr. 20–May 10.
N. of Cayuta Lake (*D.*); s. w. of Key Hill; Enfield Glen; Lick Brook ravine; s. e. of Brookton; Ellis Hollow; Six Mile Creek (*D.*!); Cascadilla Creek (*D.*); Beebe Lake; Dryden-Lansing Swamp (*D.*); Ringwood; woods, McLean Bogs (*D.*!); swamps of Groton (*D.*); Big Gully; and elsewhere.
N. B. to Ont. and Minn., southw. to Fla., Tenn., and Mo.; rare or absent on the Coastal Plain.

2. Daphne L.

1. **D. MEZEREUM** L. MEZEREUM.

Dry roadsides and stream banks, in rich gravelly calcareous soils; an occasional escape from cultivation. Apr.–May 10.
Inlet Valley, s. of Buttermilk Glen; Brookton, just s. e. of village; e. shore of Cayuta Lake, 1885 (*F. V. Coville*); Enfield Creek, above the ravine; road from Trumansburg to Taughannock, 1884 (*A. L. Coville*) and 1922; Ludlowville, just s. of village; hillside near Groton, 1886 (*D.*); Genoa; Venice.
N. S. and Ont., southw. to Mass. and N. Y. Native of Eurasia.

91. ELAEAGNACEAE (OLEASTER FAMILY)

1. Shepherdia Nutt.

1. **S. canadensis** (L.) Nutt. SHEPHERDIA.

Dry exposed cliffs and rocky slopes, in calcareous soils; frequent. May.
In the Cayuga Lake Basin, found only in the valley of Cayuga Lake: lower Six Mile Creek (*D.*!); Cascadilla Creek (*D.*); Fall Creek, below Mirror and Ithaca Falls (*D.*!); Taughannock Gorge, n. side of upper glen; frequent along the cliffs from Esty to Willets.
Newf. to Alaska and B. C., southw. to N. S., Me., Vt., n. and w. N. Y., Mich., and in the Rocky Mts. to N. Mex.

92. LYTHRACEAE (LOOSESTRIFE FAMILY)

a. Flowers regular; petals equal; calyx not gibbous.
  b. Calyx campanulate, short; leaves often whorled; stems long, recurving; petals 4–5. 1. DECODON
  b. Calyx tubular; leaves never whorled; stems not recurving; petals 5–7. 2. LYTHRUM
a. Flowers irregular; petals unequal; calyx gibbous. 3. CUPHEA

1. Decodon Gmel.

a. Leaves and stems more or less tomentose-pubescent. 1. *D. verticillatus*
a. Leaves and stems glabrous. 1a. *D. v.*, var. *laevigatus*

1. **D. verticillatus** (L.) Ell. (See Rhodora **19**: 154. 1917. *D. v.*, var. *pubescens* T. & G. *Nesea verticillata*, in part, of Cayuga Fl.) WATER WILLOW. SWAMP LOOSESTRIFE.

In shallow water of pond shores and stream banks, in calcareous or slightly saline locations; apparently rare. Aug.

Floating moor of Slayton Pond (*K. M. W., A. J. E., & L. F. Randolph*).
Me. to Fla., chiefly coastal; also, s. w. Ont. to Ill.

1a. **D. verticillatus** (L.) Ell., var. **laevigatus** T. & G. (See Rhodora **19**: 154. 1917. *Nesea verticillata*, in part, of Cayuga Fl.)

In locations similar to the preceding; frequent. Aug.

Marly shore of Mud Pond, McLean Bogs; head of Cayuga Lake (*D.*!); Sheldrake (*D.*); Farley Point (*D.*!); n. of Union Springs (*D.*!); Cayuga Marshes (*D.*!); *Newton Ponds and Pout Pond. With the exception of the marly locations, the plant* is most abundant on the Ontario plain and adjacent marshes in which there is a trace of salt from the underlying salt deposits. On the Coastal Plain the more prevalent typical form inhabits acid waters.

Chiefly inland: N. S. to Wis., southw. to s. w. Va. and Tenn.

2. Lythrum L.

a. Flowers solitary in the axils of the upper leaves; petals and stamens 5–7. 1. *L. alatum*

a. Flowers crowded, whorled, in an interrupted spike; petals usually 6; stamens 12, rarely 8 or 10. 2. *L. Salicaria*

1. **L. alatum** Pursh.

Low fields; rare. June 25–Aug. 25.

Salty meadows n. e. of Montezuma village, 1919 (*K. M. W., A. J. E., & L. F. Randolph*). Doubtfully native.

Ont. to Minn., southw. to Ga., La., and Colo.; also in s. N. E.

2. **L.** SALICARIA L. SPIKED OR PURPLE LOOSESTRIFE.

Low or wet alluvial and gravelly shores and adjacent marshes, mostly in neutral or acid soils; locally frequent. July 20–Aug. 20.

Cayuga Lake shore, w. of outlet of Fall Creek (*D.*!); shores about Renwick; on beach, Utt Point; abundant along the Clyde River, e. of Howland Island.

N. S. to Ont., southw. to N. Y., Del., and D. C. Introduced from Eu.

[L. HYSSOPIFOLIA L.

Found on garbage dumps, Ithaca flats, 1924 (*W. C. Muenscher*).]

3. Cuphea P. Br.

1. **C.** PETIOLATA (L.) Koehne. CLAMMY CUPHEA.

Fields; rare. Sept.

Edge of field above Renwick, 1905 (*J. E. Coit & R. W. Curtis*); a large patch by roadside, Cayuga Heights Road s. of first iron bridge, 1917, and persisting in this region. Adventive from farther south.

Native: N. H. to Kans., southw. to Ga. and La.

93. MELASTOMACEAE (MELASTOMA FAMILY)

1. Rhexia L.

1. **R. virginica** L. DEER GRASS. MEADOW BEAUTY.

"Sandy shores, (not now known in our Flora.) Aug." (*D.*). "In Dr. Thompson's Cat. of Plants near Aurora, (See Regent's Rep. 1841,) as *R. Mariana*. A specimen is in Herb. of Prof'r J. J. Thomas, without locality, but which he thinks was collected near Union Springs" (*D.*). Not seen in recent years.

Along the coast from N. S. to Fla.; also inland from s. w. Ont. to s. e. Iowa, southw. to La. and Mo.

94. ONAGRACEAE (EVENING PRIMROSE FAMILY).

a. Parts of the flower in 4's or more numerous.
  b. Hypanthium scarcely or not at all extended beyond the ovary.
    c. Capsule obovoid-cubical; seeds naked; sepals persistent; petals minute and reddish, or wanting. 1. LUDVIGIA
    c. Capsule linear; seeds comose; sepals deciduous; petals larger, obovate or obcordate, purple or white. 2. EPILOBIUM
  b. Hypanthium conspicuously extended beyond the ovary; seeds naked.
    c. Fruit dehiscent; flowers yellow. 3. OENOTHERA
    c. Fruit indehiscent; flowers pale pink. 4. GAURA
a. Parts of the flower in 2's; flowers minute, white; fruit uncinate-hairy. 5. CIRCAEA

1. Ludvigia L.

1. **L. palustris** (L.) Ell. WATER PURSLANE.

Ditches and wet shores, usually in muddy situations, in both calcareous and non-calcareous districts; common, and generally distributed. Aug.–Sept.

N. S. to Man. and Oreg., southw. to Fla., La., Calif., and Mex., and on the Atlantic Coastal Plain. Widely distributed in the Old World.

2. Epilobium L.

a. Petals 10–20 mm. long; stigma 4-lobed.
  b. Stamens and style declined; petals entire; hypanthium not prolonged beyond the ovary; plant glabrous or puberulent above. 1. *E. angustifolium*
  b. Stamens and style erect; petals notched; hypanthium slightly prolonged; plant hirsute. 2. *E. hirsutum*
a. Petals 9 mm. long or less; stigma entire.
  b. Stems terete, with no decurrent lines from the leaf bases; leaves linear or lanceolate, entire or nearly so, the margins revolute.
    c. Capsules and stems velvety with spreading pubescence. 3. *E. molle*
    c. Capsules and stems crisp- and subappressed-puberulent, canescent. 4. *E. densum*
  b. Stems with decurrent lines from the leaf bases; leaves lanceolate or ovate, usually toothed, the margins flat.
    c. Seeds obconic-fusiform, 1.5 mm. long, not striate, beakless; coma bright tawny to dirty white; flowers pinkish; leaves narrowed at base, closely and irregularly serrate; nearly mature fruit erect or suberect; plant, when well developed, bushy, dense. 5. *E. coloratum*
    c. Seeds obovoid, 1 mm. long, distinctly striate, short-beaked when coma is removed; coma white; flowers bluish pink or bluish purple; leaves more rounded at base, more remotely serrate; nearly mature fruit spreading; plant, when well developed, usually more strict and open, not bushy.
      d. Plant tall, puberulent above; leaves nearly or quite sessile. 6. *E. glandulosum*, var. *adenocaulon*
      d. Plant low, nearly or quite glabrous; leaves flaccid, more nearly entire, more gradually narrowed to a distinct petiole. 6a. *E. glandulosum*, var. *perplexans*

1. **E. angustifolium** L. FIREWEED. WILLOW HERB.

Dry or damp banks and open woodlands, especially in recently burned clearings, in gravelly, nearly neutral or acid, soils; common, and generally distributed. July–Aug.

Greenland to Alaska, southw. to N. C., Ind., Kans., Ariz., and Calif., including the Atlantic Coastal Plain. Found also in Eu. and Asia.

A form with white flowers (forma *albiflorum* (Dum.) Haussk., see Rhodora 20:4, 1918) has been found at Freeville (*D.*). A form with pale pink flowers occurs along the state road east of the McLean Bogs.

2. **E. HIRSUTUM** L.

Low fields on the borders of swales and swamps and in damp waste places, in gravelly, mostly saline or calcareous, soils; scarce, but locally abundant. July–Aug.

Spencer Lake, rare; athletic field, C. U. campus, rare; waste ground near the salt works, s. of the lighthouse road, Ithaca; pastures along the railroad between McLean and Chicago Crossing, abundant; North Spring, Union Springs; Canoga Marshes; near salt flats, Montezuma; banks of abandoned canal n. of Cayuga village, abundant; n. of Miller Bog, Spring Lake. Of recent introduction. Apparently just appearing in the southern part of the Cayuga Lake Basin.

S. Me. to Ont. and s. N. Y. Naturalized from Eu.

3. **E. molle** Torr. (*E. strictum* Muhl., *nomen subnudum.*)

Open meadows, in boggy marly soil; frequent. July 15–Sept. 15.

Spencer Lake; swamp w. of Key Hill; Michigan Hollow Swamp (*D.*!); swampy place on hill s. of Buttermilk reservoir; Larch Meadow (*D.*!); Ellis Hollow Swamp; e. of Etna station; Mud Creek, Freeville (*D.*!); Malloryville (*D.*); near McLean Bogs (*D.*!); Townley Swamp; e. of Duck Lake; Junius marl ponds; and elsewhere.

E. Que. to Alberta, southw. to Va., Ill., and Minn.; rare or absent on the Coastal Plain.

4. **E. densum** Raf. (*E. lineare* of LeConte and of Muhl., both *nomina nuda*. *E. palustre*, var. *lineare*, of Cayuga Fl.)

In situations similar to the preceding, but apparently less closely confined to calcareous soils; frequent. Aug.–Sept.

Swamp w. of Key Hill; Michigan Hollow Swamp; hill s. of Buttermilk Glen; Larch Meadow; Fleming Meadow; McLean Bogs; Beaver Brook; Junius marl ponds; e. of Duck Lake.

E. Que. to Alberta, southw. to Del., W. Va., Kans., and Colo.; frequent on the northern Coastal Plain.

5. **E. coloratum** Muhl. (*E. coloratum*, in part, of Cayuga Fl.) WILLOW HERB.

Ditches and the borders of marshes or swamps, and on wet cliffs, in light or heavy soils, either calcareous or noncalcareous; common, and generally distributed. July–Sept.

N. S. to Wis., southw. to S. C., Tenn., Kans., and Nebr.; common on the Coastal Plain.

6. **E. glandulosum** Lehm., var. **adenocaulon** (Haussk.) Fernald. (See Rhodora 20:34. 1918. *E. adenocaulon* of authors.) WILLOW HERB.

In situations similar to the preceding, apparently with as little reference to the type of soil; somewhat less common than *E. coloratum*. July–Sept.

Summit Marsh and vicinity; near Enfield Glen; city dump, Ithaca; scattered stations along Cascadilla Glen; Ellis Hollow; Fall Creek, near Triphammer Falls, near Varna, and near Warren's woodlot e. of Forest Home; Woodwardia Bog; Dryden Lake; McLean Bogs; Beaver Brook; moor of Chicago Bog; lake shore near McKinneys; Glenwood Road; Union Springs; Junius peat bogs; Slayton Pond; and elsewhere.

Newf. to B. C., southw. to Del., W. Va., the Great Lakes, Nebr., Colo., and Calif.; infrequent on the Atlantic Coastal Plain.

6a. **E. glandulosum** Lehm., var. **perplexans** (Trel.) Fernald. (See Rhodora **20**: 34. 1918.)

Sunny, moist, more or less calcareous, ledges on cliffs; rare. July.

Fall Creek, 1870 (in C. U. Herb., collector unknown); n. side of Taughannock Gorge, head of path to top of cliff, 1907 (*Anna Allen* in C. U. Herb.!); lake shore cliffs n. of McKinneys.

E. Que. to B. C., southw. to N. E., N. Y., Wis., N. Mex., and Calif.; rare or absent on the Atlantic Coastal Plain.

3. Oenothera L.

a. Plants tall, 10–20 dm. high, stout; capsules linear-lanceolate or cylindrical; seeds in two rows in each cell; flowers imperfectly nocturnal.

b. Leaves somewhat fleshy, glabrous or finely strigose; tips of the sepals usually not quite terminal, therefore separated in the bud; body of seed 1.7–2.2 mm. long, 1–1.5 mm. in diam.

c. Plants, including the young growth, nearly glabrous. 1. *O. parviflora*, var. *angustissima*

c. Plants more strigose, the young growth and capsules usually very hairy. 1a. *O. p.*, var.

b. Leaves thinner, velvety-pubescent; tips of the sepals usually terminal, therefore in contact in the bud; body of seed (1.2) 1.4–1.8 mm. long, 0.8 mm. in diam., the integument less firm.

c. Stems sparingly crisp-pubescent and with some hirsute hairs, or glabrate, usually reddish, scarcely angled; capsules and young growth glabrous to sparingly glandular-velvety and hispid.

d. Bracts falling early; the full-grown but unripe capsules 23–25 mm. long, glabrous or very sparingly glandular-velvety, tapering and almost beaked at the small but dilated, 4-lobed apex, these lobes entire; leaves lanceolate; stems commonly red. 2. *O. biennis*, var. *nutans*

d. Bracts persistent; capsules 25–33 mm. long, velvety-glandular and more or less hirsute, the less beaked apex scarcely dilated, 4-lobed, the lobes retuse; leaves narrowly lanceolate; stems green or reddish. 2a. *O. biennis*, var. *pycnocarpa*

c. Stems more densely crisp-pubescent, often with scattered longer hairs, green, rarely tinged with purple, angled; leaves very velvety; capsules and young growth densely crisp-pubescent and subappressed-hirsute, practically non-glandular; the full-grown but unripe capsules 27–30 mm. long. 2b. *O. b.*, var.

a. Plants low, 1–6 dm. high, slender; capsules clavate, ribbed; seeds not in distinct rows, clustered; flowers open in sunshine.

b. Capsules obscurely glandular-puberulent; leaves glabrous; stems puberulent; petals 5–10 mm. long. 3. *O. perennis*

b. Capsules hirsute; leaves and stems hirsute; petals 15–25 mm. long. 4. *O. pratensis*

1. **O. parviflora** L., var. **angustissima** (Gates) Wiegand. (See Rhodora **15**: 46, 1913, and **26**: 3, 1924. *O. angustissima* Gates.) EVENING PRIMROSE.

Sandy and gravelly shores, in calcareous soils; frequent. July–Sept.

Confined to the lake valley and the shores of Cayuga Lake, and extending from Ithaca to Cayuga on both sides of the lake.

N. Y., probably to W. Va., and perhaps farther westw.

The name *O. parviflora* L. is here adopted for the species complex of which this plant is a part, rather than the later name *O. muricata* L. Presumably Linnaeus had

different strains of the same species in hand when he proposed these two names Other strains of the species besides the two found in this flora occur on the Atlanti Coast and in western U. S.

1a. **O. parviflora** L., var.

Stony and sandy shores; local.

Shore, Lake Ridge; talus at foot of cliffs n. of King Ferry; shore at Long Point The same form, apparently, occurs on the sandy shores of Lake Ontario.

2. **O. biennis** L., var. **nutans** (Atkins. & Bart.) Wiegand. (See Rhodora **15**: 83 1913, and **26**: 3, 1924. *O. nutans* Atkins. & Bart.) EVENING PRIMROSE

Damp sandy or gravelly fields and stream banks, in rich or calcareous locations frequent. July–Aug.

Widely distributed in e. N. A.

The present treatment of *O. biennis* L. and its allies has been worked out afte the collection of a large amount of local material and a study of the group at th Gray Herbarium. It has not been possible to correlate all the related species recentl proposed by various writers, and the treatment here given is not considered final bu simply as the best method of dealing with the local forms for the present. A country-wide consideration of the group seems to show two good "taxonomic" species *O. parviflora* and *O. biennis*, separated by fairly constant characters of pubescenc and seed, but the strains within each of these species intergrade extensively.

2a. **O. biennis** L., var. **pycnocarpa** (Atkins. & Bart.) Wiegand. (See Rhodora **15**: 83, 1913, and **26**: 3, 1924. *O. pycnocarpa* Atkins. & Bart.)

Dry fields and roadsides, in gravel and clay; common. July–Aug., and often agai in Sept.

N. E. to Minn., and southw.

2b. **O. biennis** L., var.

Dry fields and roadsides, in sandy or gravelly, often more acid, soils; frequen July–Aug., and again in Sept.

Near the Agricultural College greenhouses; Recknagel lot, Upland Road, Cayug Heights; n. of Townley Swamp; gravelly lake shores, Lake Ridge, King Ferry, an Long Point; n. of Cayuta Lake; sandy field, Phillips farm, West Junius.

Widely distributed in e. N. A.

3. **O. perennis** L. (See Rhodora **25**: 47. 1923. Bul. Torr. Bot. Club **46**: 372. 1919 *O. pumila* L. and of Cayuga Fl.) SUNDROPS.

Damp sandy or gravelly fields and roadsides, in sterile, mostly neutral, soils abundant. June 20–July.

Common in nearly all the towns s. and e. of Ithaca, and back from the shores o Cayuga Lake.

Newf. and Man., southw. to Ga. and Wis.; less common or rare on the Coasta Plain.

4. **O.** PRATENSIS (Small) Robinson. SUNDROPS.

Brackish meadows; rare. June 20–July.

N. e. of Montezuma village, 1919 (*K. M. W., A. J. E., & L. F. Randolph*) abundant.

S. Me. to Conn., also cent. N. Y. to Iowa, southw. to Ark.

This species is probably adventive here, as a plant so showy would scarcely have been overlooked by Dudley.

4. Gaura L.

1. **G. biennis L.**

Damp banks or shores, in sandy or gravelly, more or less calcareous, soils; occasional. July 20–Oct.

Swale along road between Buttermilk Creek and Enfield Creek; near the Old Armory, C. U. campus, formerly (*D.*); Six Mile Creek (*D.*!); Renwick; Taughannock Point; s. of Utt Point; Union Springs; "not rare on the sandy points all along Cayuga L." (*D.*).

W. Que. and Conn. to Minn., southw. to Ga., Nebr., and Ark.; rare on the Coastal Plain.

5. Circaea (Tourn.) L.

a. Leaves firm, shallowly undulate-dentate; sepals 1.8–2.6 mm. wide; disk cup-like, prolonged about 0.5 mm. above the perianth; anthers 0.7–1 mm. long; fruit with 3–5 corrugations on each face, 3.5–5 mm. thick (including the hairs). 1. *C. latifolia*

a. Leaves thin, flaccid, coarsely sharp-dentate, more cordate; sepals 0.8–1.7 mm. wide; disk inconspicuous; anthers 0.2–0.8 mm. long; fruit more clavate, not corrugated, 1–3 mm. thick.

b. Rhizome slender, scarcely tuberous-thickened; sepals 1.2–1.7 mm. wide; petals 2.3–3.5 mm. long; anthers 0.5–0.8 mm. long; fruit 2-celled, 1.5–3 mm. thick; hairs long. 2. *C. canadensis*

b. Rhizomes tuberous-thickened; sepals 0.8–1.2 mm. wide; petals 1.2–2.5 (3) mm. long; anthers 0.2–0.3 mm. long; fruit 1-celled, 1–1.5 mm. thick; hairs very short. 3. *C. alpina*

1. **C. latifolia** Hill. (See Rhodora 17:222, 1915, and 19:87, 1917. *C. lutetiana* of authors and of Cayuga Fl.) ENCHANTER'S NIGHTSHADE.

Rich moist or rather dry gravelly woodlands and banks, chiefly in neutral soils; not uncommon. July–Aug.

On the gravelly banks in or near most of the ravines of the basin, Renwick woods, and especially the woods of the McLean district; rare or absent on the ericaceous-chestnut soils and on the clays.

N. B., N. S., and Me., to Minn., southw. to N. C., Tenn., and Okla., but much less common, or rare, on the Coastal Plain. Found also in e. Asia.

Fernald (Rhodora 19:85, 1917) gives other differences between these three species of Circaea.

2. **C. canadensis** Hill. (See Rhodora 19:87, 1917. *C. intermedia* of Gray's Man., ed. 7.)

Damp rich alluvial bottom-land woods, in gravelly, more or less calcareous, soils; rare. July–Sept.

Below Lucifer Falls (*A. J. E.* and *E. Dean*); below the falls, Taughannock Gorge; Salmon Creek, below Genoa.

E. Que. and N. S., to w. Mass. and N. Y. Found also in Eu.

3. **C. alpina L.**

Damp ground and rotting logs in cool woodlands, mostly over gravelly calcareous soils; frequent. June 20–Aug.

Caroline hills; *Coy Glen*; *Six Mile Creek*; *n. e. of Hanshaw Corners*; *Mud Creek, Freeville*; McLean Bogs; Beaver Brook; Shurger Glen; e. of Clyde; and elsewhere.

S. Lab. to James Bay and Alaska, southw. to s. N. E., Ga., the Great Lakes, and S. Dak.; rare on the Atlantic Coastal Plain. Found also in Eurasia.

95. HALORAGIDACEAE (WATER MILFOIL FAMILY)

a. Leaves whorled.
  b. Leaves pinnately dissected; stamens 4–8; fruit 4-celled, 4-lobed. 1. MYRIOPHYLLUM
  b. Leaves entire, linear; stamen 1; fruit 1-celled. 2. HIPPURIS
a. Leaves alternate; stamens 3; fruit 3-celled, 3-angled. 3. PROSERPINACA

1. Myriophyllum (Vaill.) L.

a. Bracts entire or denticulate.
  b. Bracts oval, not longer than the fruit; stamens 8; fruiting carpels 2–3 mm. long, smooth; stigmas obscure; rhachis of leaf about the width of the divisions. 1. *M. exalbescens*
  b. Bracts oblanceolate, much longer than the fruit; stamens 4; fruiting carpels 1–1.5 mm. long, papillose, 2-ridged on the back; stigmas prominent; rhachis of leaf slightly broader than the divisions. 2. *M. heterophyllum*
a. Bracts pinnatifid or pectinate; stamens 8; fruiting carpels 2.5–3 mm. long, smooth; stigmas prominent, recurved; rhachis of leaf slightly broader than the divisions. 3. *M. verticillatum*, var. *pectinatum*

1. **M. exalbescens** Fernald. (See Rhodora **21**: 120. 1919. *M. spicatum* of authors and of Cayuga Fl.) WATER MILFOIL.

Waters of the larger lakes and their adjacent marshes; frequent. July–Aug.

"Common in the Inlet of Cayuga L., the mouth of Fall Cr., and throughout the lake and outlet in shallow water, to Montezuma" (*D.*!); head of Cayuga Lake; pool on Taughannock Point; Cayuga Marshes.

Lab. to Alaska, southw. to Conn., N. Y., the Great Lakes, Kans., N. Mex., Ariz., and Calif. Found also in Eurasia. A northern species.

Perhaps influenced in its local distribution by the slightly brackish character of the Cayuga Lake waters.

2. **M. heterophyllum** Michx.

In calcareous and slightly brackish waters; rare. Aug.–Oct.

"Outlet of North Spring at Union Springs" (*D.*, a specimen in C. U. Herb.); not seen by the authors.

N. J. to Fla., near the coast; also from cent. N. Y. and Ont. to Minn., southw. to Mo. and Tex.

3. **M. verticillatum** L., var. **pectinatum** Wallr. (*M. verticillatum* of Cayuga Fl.)

Waters of the larger lakes and their adjoining marshes; rare. Aug.

"Bayou near mouth of Fall Cr. (*Trelease, 1878*)!" (*D.*); s. end of Cayuga Lake (*D.*); Montezuma Marshes, in the pits near the marl works (*D.*); Cayuga Bridge, 1874 (*D.*); "occasional in the lake-outlet" (*D.*). Not seen in recent years. Dudley specimens from the Fall Creek, s. end of Cayuga Lake, and Montezuma stations are in the C. U. Herb., and a Dudley specimen from the Fall Creek station is in the Gray Herb.

Newf. and Ont. to Wash., southw. to Md., Ill., and Utah; rare or absent on the Atlantic Coastal Plain.

2. Hippuris L.

1. **H. vulgaris** L. MARE'S-TAIL.

"'Cayuga, *Dr. Jed. Smith*,' (*Sartwell in H. and C.*) Not uncommon about the outlet of North Pond at Union Springs 40 or 50 years since. (*Prof'r J. J. Thomas.*)" (*D.*); not seen by Dudley or by the authors.

Lab. to Alaska, southw. to N. S., Me., Vt., N. Y., Ind., Ill., Nebr., N. Mex., and Calif., especially in calcareous and saline situations. Found also in Eurasia and S. A.

3. **Proserpinaca** L.

1. **P. palustris** L. MERMAID WEED.

Shallow water of marshes, possibly influenced by saline conditions; scarce. July–Sept.

Summit Marsh (*D.*); near Renwick (*D.*!); Cayuga Marshes (*D.*); marsh about Crusoe Lake.

N. B. and N. S. to Minn., southw. to Fla. and Tex.; frequent along the coast.

96. ARALIACEAE (GINSENG FAMILY)

a. Plant not climbing; leaves compound, not evergreen.
  b. Leaves alternate, decompound; carpels 5; fruit black; inflorescence compound. 1. ARALIA
  b. Leaves verticillate, 1-compound; carpels 2-3; fruit red or yellow; inflorescence simple. 2. PANAX
a. Plant climbing; leaves palmately lobed, evergreen. 3. HEDERA

1. **Aralia** (Tourn.) L.

a. Umbels in a narrow panicle, on a zigzag leafy stem; leaves very large, decompound. 1. *A. racemosa*
a. Umbels arranged subcorymbosely; stem strict, leafy, often prickly at base; leaves smaller, 2-pinnate. 2. *A. hispida*
a. Umbels arranged subumbellately, on a naked scape; leaves basal, ternate and pinnate, medium or large. 3. *A. nudicaulis*

1. **A. racemosa** L. SPIKENARD.

Rich woodlands and especially ravine banks, in neutral or slightly calcareous gravels or shales; frequent. July 20–Aug.

Enfield Glen; Coy Glen; Six Mile Creek; Cascadilla Creek; Fall Creek, at Beebe Lake and near the iron footbridge; McLean Bogs; and elsewhere.

N. B. and N. S. to Minn., southw. to Ga., Mo., and S. Dak.; occasional on the Coastal Plain.

2. **A. hispida** Vent. BRISTLY SARSAPARILLA.

Dry open banks and hilltops, in neutral or acid gravelly soils; infrequent. June 20–July 20.

N. of Summit Marsh (*D.*); Six Mile Creek, s. of Green Tree Falls (*D.*); West Dryden (*D.*); s. of Woodwardia Bog (*D.*); near Malloryville Bog (*D.*!); around McLean Bogs; along railroad e. of Chicago Crossing; Junius; Montezuma Marshes (*S. H. Wright*, D.); sandy woods n. e. of Duck Lake; e. of Featherbed Bog; s. of Pout Pond peat bog.

Newf. to Hudson Bay, southw. to N. C., W. Va., Ind., Mich., and Minn.; frequent on the Coastal Plain.

3. **A. nudicaulis** L. WILD SARSAPARILLA.

Common in dry woodlands and on banks, in gravelly subcalcareous, neutral or acid, soils; less frequent on the more acid gravels of the higher hills. May.

Newf. to Man., southw. to Ga., Mo., Colo., and Idaho; frequent on the Coastal Plain.

2. **Panax** L.

a. Plant 2–4 dm. high; leaflets stalked, acuminate, the larger ones 8–15 cm. long; fruit red; fleshy root fusiform or conical. 1. *P. quinquefolium*
a. Plant 0.5–2 dm. high; leaflets sessile, obtuse or acute, the larger ones 3–6 cm. long; fruit yellowish; fleshy root globular. 2. *P. trifolium*

1. **P. quinquefolium** L. (*Aralia quinquefolia* of Cayuga Fl.) GINSENG.

Damp woodlands, in rich humus on subcalcareous gravelly soils; formerly frequent now occasional. June 20–July.

"Rich woods in Danby, Caroline and Newfield" (*D.*); wooded island in Summi Marsh; Michigan Hollow; Enfield Glen; Six Mile Creek (*D.*!); hill w. of Wes Danby; Fall Creek, below Primrose Cliffs (*D.*); Freeville (*D.*); McLean (*D.*) "ravines of the lake-shore" (*D.*); Ludlowville; Paine Creek glen; e. of Mud Pond Conquest; s. w. of Westbury.

Que. and Ont. to Minn., southw. to Pa., the Great Lakes, e. Iowa, Mo., and in th mts. to Ga.; absent or rare on the Coastal Plain.

Roots extensively collected as a commercial product.

2. **P. trifolium** L. (*Aralia trifolia* of Cayuga Fl.) DWARF GINSENG OR GROUNDNUT

Rich gravelly woodlands and thickets, in subcalcareous or slightly acid regions frequent. May.

S. w. of Key Hill; near Michigan Hollow Swamp; Six Mile Creek; Ellis Hollow woods n. of Ithaca; Malloryville Bog; Beaver Brook; and elsewhere.

N. S. to Minn., southw. to Del., Md., Ill., Iowa, and along the mts. to Ga. occasional on the Coastal Plain.

3. Hedera (Tourn.) L.

1. **H. HELIX** L. ENGLISH IVY.

Damp rocks near brooks; scarce.

Six Mile Creek, on n. side above Van Natta Dam (*W. C. Muenscher*) and on s side below Beech Woods.

Escaped from cultivation. Native of Eu.

97. UMBELLIFERAE (PARSLEY FAMILY)

a. Involucral bracts (not involucels) entire or serrate or wanting; fruit with th five primary ribs the most prominent, hence with three dorsal ribs on each carpe
- *b.* Fruit with obscure ribs, covered with hooked prickles; flowers monoecious greenish white; leaves palmately parted or divided. 1. SANICULA
- *b.* Fruit with obscure or prominent ribs, not prickly; flowers perfect; leave various.
  - *c.* Body of fruit laterally flattened; ribs not winged.
    - *d.* Umbels and leaves simple, the umbels axillary; flowers greenish white. 2. HYDROCOTYLE
    - *d.* Umbels and leaves compound, the umbels terminal.
      - *e.* Flowers white.
        - *f.* Leaves ternately decompound, only the ultimate divisions of the lea subpinnate.
          - *g.* Seed face strongly concave in cross section.
            - *h.* Fruit linear-oblong.
              - *i.* Fruit glabrous; plants low, spreading; leaflets much cut. 3. CHAEROPHYLLUM
              - *i.* Fruit bristly; plants upright, moderately tall; leaflets coarsel serrate or sparingly cleft. 4. OSMORHIZA
            - *h.* Fruit ovate; plants tall; leaflets much cut. 5. CONIUM
          - *g.* Seed face flat; plants tall; leaflets lanceolate, serrate. 6. CICUTA
        - *f.* Leaves pinnate (see also 3d *f*).
          - *g.* Leaflets much dissected into very narrow divisions. 7. CARUM
          - *g.* Leaflets lanceolate, serrate. 8. SIUM

f. Leaves 3-foliolate. 9. CRYPTOTAENIA
e. Flowers yellow.
f. Leaflets serrate. 10. ZIZIA
f. Leaflets entire. 11. TAENIDIA
c. Body of fruit subglobose, not flattened; ribs not winged; flowers white or roseate; cauline leaves finely dissected (see also 3d *c*). [CORIANDRUM]
c. Body of fruit strongly dorsally flattened; lateral ribs winged.
d. Flowers yellow; stylopodium depressed.
e. Leaflets coarse.
f. Leaves 1-pinnate; stem strongly furrowed; involucre none. 12. PASTINACA
f. Leaves 2-pinnate; stem not furrowed; involucre conspicuous. 13. LEVISTICUM
e. Leaflets finely dissected. [ANETHUM]
d. Flowers white; stylopodium often more conical.
e. Lateral wings of the fruit coherent, appearing as one; oil tubes solitary in the intervals.
f. Petals of the outer flowers irregularly enlarged, obcordate; leaves tomentose, the upper ones simple. 14. HERACLEUM
f. Petals not enlarged; leaves not tomentose, all compound. 15. IMPERATORIA
e. Lateral wings separate, appearing as two; oil tubes more than one.
f. Leaflets incised-cleft, rather finely divided; stylopodium short-conical. 16. CONIOSELINUM
f. Leaflets coarse, simply or doubly serrate; stylopodium depressed. 17. ANGELICA
a. Involucral bracts cleft or pinnatifid; fruit with the two dorsal secondary ribs and the two lateral primary ribs the most prominent, hence with two dorsal ribs on each carpel, these ribs ciliate with barbed prickles; umbels usually concave in fruit; petals white, the outer ones often enlarged. 18. DAUCUS

1. Sanicula (Tourn.) L.

a. Styles much exceeding the bristles of the fruit, recurved.
b. Sepals of the staminate flowers lanceolate, 1.5–2 mm. long; fruit 6–7 mm. long; plant coarse; flowers whitish green. 1. *S. marilandica*
b. Sepals of the staminate flowers triangular-ovate, 0.7–0.9 mm. long; fruit 3–4 (5) mm. long; plant less coarse; flowers yellowish green. 2. *S. gregaria*
a. Styles shorter than the bristles.
b. Staminate flowers short-pedicelled; fruit subglobose, 3–4 (5) mm. long; calyx depressed; leaf segments 3–5, rather narrow. 3. *S. canadensis*
b. Staminate flowers on long slender pedicels; fruit ovoid, 5–8 mm. long, tipped with a conspicuous calyx; leaf segments commonly 3, broader. 4. *S. trifoliata*

1. S. marilandica L. SANICLE.

Damp or rather dry rich borders of woods and thickets, in gravelly neutral or acid soils; frequent. Fr. July 15–Aug.

Enfield Glen; Six Mile Creek; Cascadilla woods; Fall Creek; McLean; and elsewhere.

Newf. to Alberta, southw. to Ga. and Colo.; frequent on the Coastal Plain.

2. S. gregaria Bickn.

Gravelly woodlands and thickets, in richer, more moist, and less acid soils than the preceding; frequent. Fr. July 20–Aug.

Newfield Glen; Enfield Glen; bottom lands, Six Mile Creek; Cascadilla woods; McGowan Woods; bottom-land woods, Taughannock Gorge.

N. B. and N. S. to Minn., southw. to Ga. and Ark.; rare or absent on the Coastal Plain.

Often found in large colonies, in this respect apparently unlike other species of Sanicula.

3. **S. canadensis** L.

Woodlands and thickets, in sandy or gravelly, more or less acid, soils; infrequent. Fr. July 20–Aug.

Enfield Glen; Six Mile Creek; bottom lands, Taughannock Gorge; small ravine e. side of Salmon Creek, opposite Lansingville; Paine Creek; Big Gully; n. of Waterloo; sandy woods, e. shore of Vandemark Pond.

N. H. to Minn. and S. Dak, southw. to Fla., Nebr., and Tex.; frequent on the Coastal Plain.

4. **S. trifoliata** Bickn.

Woodlands, in rich loamy soils; infrequent. Fr. July 20–Aug.

Newfield Glen; Enfield Glen; Six Mile Creek; Freeville, e. of George Junior Republic; bottom lands, Taughannock Gorge; Paine Creek; e. part of Savannah Township.

Cent. Me., and from w. N. E. to Ont. and Minn., southw. to W. Va. and Ind.; rare or absent on the Coastal Plain.

2. Hydrocotyle (Tourn.) L.

a. Leaves cordate; umbels sessile, axillary. 1. *H. americana*
a. Leaves peltate; umbels long-peduncled. [*H. umbellata*]

1. **H. americana** L. WATER PENNYWORT.

Springy grassy half-shaded places on the lighter soils and on wet ledges, showing little relation to lime; common. Fr. July 15–Aug.

N. S. to Minn., southw. to N. J., Pa., and in the mts. to N. C., including the northern part of the Coastal Plain.

[H. UMBELLATA L.

Collected in 1901 in Eddy Pond, Cascadilla Glen, but since exterminated by extensive grading. Said to have been introduced there by early botanists.]

3. Chaerophyllum (Tourn.) L.

1. **C. procumbens** (L.) Crantz. WILD CHERVIL.

Thickets on rich bottom-land soils; rare. Fr. May 15–June 15.

Buttermilk Glen (*Dr. Jordan* in C. U. Herb.); Negundo Woods, 1874 (*D.*); by creek and by railroad near Esty's Tannery, that is, between railroad and Humboldt St. near Ithaca (*D.*); not seen in recent years.

N. Y. to Mich., southw. to N. C., Iowa, Ark., and Miss., invading the western border of the Coastal Plain in N. J. A plant of the rich soils of the Ohio and Mississippi Basins.

4. Osmorhiza Raf.

a. Stylopodium and style 0.7–1 mm. long; stems and leaves more or less villous or hirsute. 1. *O. Claytoni*
a. Stylopodium and style 2–4 mm. long; leaves somewhat less coarsely and irregularly toothed.
  b. Stems glabrous or nearly so; leaves nearly glabrous. 2. *O. longistylis*
  b. Stems hairy; leaves hairy. 2a. *O. longistylis*, var. *brachycoma*

1. **O. Claytoni** (Michx.) Clarke. (*O. brevistylis* of Cayuga Fl.) HAIRY SWEET CICELY.

Woods and ravines, in gravelly or shaly, neutral or calcareous, soils; common. Fr. June 20–July.

E. Que. and N. S. to S. Dak., southw. to N. C., Ala., Mo., and Kans.; rare or absent on the Coastal Plain. A plant of the rich soils of the interior.

The stems vary from villous to almost glabrous.

2. **O. longistylis** (Torr.) DC. LONG-STYLED SWEET CICELY.

In situations similar to the preceding, but in deeper, often more alluvial, soils, sometimes in sandy loam; frequent. Fr. June 20–July.

Ball Hill, Danby; Inlet Valley, s. of Enfield Creek (*D.* in C. U. Herb.); Buttermilk Falls; Negundo Woods (*D.*); roadside s. of Brookton; Cascadilla Glen, along Goldwin Smith Walk and on Violet Island; Forest Home Path; Renwick slope; lake shore, two miles n. of Renwick (in C. U. Herb.); and elsewhere.

E. Que. to Sask., southw. to Ala., Ill., Iowa, N. Dak., and Colo.; occurring sparingly on the Coastal Plain. A plant primarily of the rich lands of the interior.

2a. **O. longistylis** (Torr.) DC., var. **brachycoma** Blake. (See Rhodora **25**: 110. 1923.)

In situations similar to the preceding: rare.

Little Salmon Creek valley, Genoa; w. of Canoga Marshes; thicket on lake shore s. of Union Springs.

W. Conn. and Pa. to Ill. and Kans.

The var. *villicaulis* Fernald, with cauline hairs 1–2 mm. long instead of 0.3–0.8 mm. long, has not been found in the Cayuga Lake Basin.

5. Conium L.

1. C. MACULATUM L. POISON HEMLOCK.

A weed in damp waste places and by roadsides, in rich gravelly or loamy, more or less calcareous, soils; frequent. Fr. July–Aug.

Spencer St., toward Buttermilk Glen; Six Mile Creek, near Ferris Place bridge; roadside near Renwick; farmyards, Salmon Creek valley; and elsewhere.

Que. to Ont. and Mich., southw. to Del., Pa., and Ind., also in Calif., Mex., and S. A. Naturalized from Eu.

Very poisonous if eaten.

6. Cicuta L.

a. Leaflets lanceolate; fruit 3–3.5 mm. long. 1. *C. maculata*

a. Leaflets narrowly linear; fruit 1.5–2 mm. long; upper leaf-axils bulblet-bearing in autumn. 2. *C. bulbifera*

1. **C. maculata** L. WATER HEMLOCK. MUSQUASH ROOT. BEAVER POISON.

Swamps, marshes, and ditches, in mucky or alluvial soil, less commonly in calcareous regions; common, and generally distributed. Fr. July 20–Sept.

N. B. to Man., southw. to Fla. and N. Mex.; common on the Coastal Plain.

Poisonous if eaten.

2. **C. bulbifera** L.

In situations similar to the preceding, usually in shallow water; frequent, and generally distributed. Fr. Sept.–Oct.

Newf. to B. C., southw. to Md., Ind., Nebr., and Oreg.; frequent on the Atlantic Coastal Plain.

7. **Carum** L.

1. **C.** CARVI L. CARAWAY.

A weed by roadsides, in gravelly neutral or calcareous soils; frequent. F July 15–Sept.

Rare near Ithaca and on the shore of Cayuga Lake, elsewhere frequent: Di Run, Spencer and near North Spencer; s. w. corner of Enfield; w. of Caroli *Pinnacles*; *South Hill*, s. *of the marsh and* s. *of the* "Incline"; *Brookton*; Casc: dilla Creek; Renwick woods; near McGowan Woods; Forest Home; near Rin; wood; McLean; around schoolhouse n. of Esty; and elsewhere. A northern plar more common on the higher hills.

Newf. to S. Dak., southw. to Pa. and Colo.; abundant as a weed northw *Naturalized from* Eu.

The form with rose-colored flowers (forma *rhodochranthum* A. H. Moore, s Rhodora 11: 178, 1909) "near road from Danby to West Danby" (*D.*).

8. **Sium** (Tourn.) L.

1. **S. suave** Walt. (See Rhodora 17: 131. 1915. *S. cicutaefolium* of authors and c Cayuga *Fl.*). WATER PARSNIP.

In the shallow water of swamps, marshes, and ditches, in mucky or alluvial soil: frequent. Fr. Sept.–Oct.

Inlet Marshes; *Malloryville Bog*; *Cayuga Marshes*; Montezuma; and elsewher

Newf. to B. C., southw. to Fla., La., and Calif.; frequent along the coast.

A very peculiar plant, with flowers, fruit, and involucels of this species, b with oblong-lanceolate, irregularly, coarsely, and less sharply toothed leaflets, tl terminal ones sometimes lobed, was found by Dudley in ditches near the fa grounds (*Cayuga Flora*, no. 353). *A specimen of this is in the herbarium* c Cornell University and another is in the Gray Herbarium. The form has not be seen since, and neither have other specimens of a similar nature been seen in oth herbaria.

9. **Cryptotaenia** DC.

1. **C. canadensis** (L.) DC. HONEWORT.

Damp woods, shady roadsides, and yards, in gravelly nonacid soils; common. F July 20–Sept.

N. B. to S. Dak., southw. to Ga., Mo., and Tex.; occasional but rare on tl Coastal Plain.

Cryptotaenia is in the list of *nomina conservanda* of the International Code.

10. **Zizia** Koch

a. Basal and cauline leaves 2–3-ternate; leaflets very acute; fruit oval, 4 mm. lon 1. *Z. aurea*

a. Basal leaves suborbicular, cordate, unlobed, cauline leaves with 3–5 rath bluntish leaflets; fruit ovate, 3 mm. long. 2. *Z. corda*

1. **Z. aurea** (L.) Koch. (***Thaspium aureum*, var. *apterum*,** of Cayuga Fl.) MEADO PARSNIP. GOLDEN ALEXANDERS.

Rich damp fields and roadsides, mostly in alluvial nonacid soils; frequent. F July–Aug.

Near Spencer Lake; below Newfield village; Negundo Woods (*D.*); Six Mi Creek (*D.!*); Renwick woods; n. end of Parkway, Cayuga Heights, abundant; Fa Creek, above and below Forest Home; Ellis Hollow; e. of Etna (*D.*); Mud Cree Freeville; e. of Levanna (*D.*); Venice (*D.*); especially frequent in the McLea region.

E. Que. to Sask., southw. to Fla., Ark., and Tex.; infrequent on the Coastal Plai

A Dudley specimen in the C. U. Herbarium, labeled "*Thaspium aureum* Nutt.," is *Zizia aurea*. Since this specimen is from the only station given by Dudley for *Thaspium aureum*, the inclusion of the latter species in the *Cayuga Flora* was undoubtedly an error.

2. **Z. cordata** (Walt.) DC. (*Thaspium trifoliatum*, var. *apterum*, of Cayuga Fl.) HEART-LEAVED ALEXANDERS.

Dry upland slopes, open woods, and thickets, in gravelly and stony, rather heavy, acid or neutral soils; locally common. Fr. July 20–Aug.

Enfield Glen; mouth of Coy Glen; s. of Buttermilk Glen, common; Six Mile Creek; Fall Creek; Renwick slope; and elsewhere; most abundant about the crests of the ravines and lake-shore cliffs. Not found in the McLean region.

R. I. (?) and Conn. to Alberta, southw. to Ga., Mo., Colo., and Oreg.; rare on the Atlantic Coastal Plain.

11. Taenidia Drude

1. **T. integerrima** (L.) Drude. (*Pimpinella integerrima* of Cayuga Fl.)

Dry banks of ravines and in open woods, in gravel or sand mixed with clay; frequent. Fr. July–Aug.

Below Newfield village; Coy Glen; Six Mile Creek; Cascadilla Creek; Fall Creek; Cayuga Heights; McKinneys; Paine Creek; and elsewhere. Not found on the hills s. of Ithaca or in the McLean region.

W. Que. and w. N. E. to Minn., southw. to Ga. and Miss.; rare or absent on the Coastal Plain.

[Coriandrum (Tourn.) L.]

[**C.** SATIVUM L. CORIANDER.

Circus common, s. of Percy Field, Ithaca, 1894 (*K. M. W.*), from seeds accidentally scattered; not seen since.

Native of Eurasia.]

[Thaspium Nutt.]

[**T. trifoliatum** (L.) Gray. (See Rhodora **20**: 52. 1918.)

House (*Bul. N. Y. State Mus. 254, 1924*) says of *Thaspium trifoliatum* (L.) Gray: "In woods near Ithaca, *C. S. Sheldon* (state herbarium)." Though species of Thaspium have been diligently sought here by the authors, none have been found.]

[**T. aureum** Nutt.

Plants so named by Dudley are *Zizia aurea*, which see.]

12. Pastinaca L.

1. **P.** SATIVA L. PARSNIP.

A weed in damp fields and waste places and on roadsides, in rich heavy soils that are not too acid; common and general, except possibly in the acid chestnut soils. Fr. July–Aug.

Native of Eu.; now naturalized very generally in N. A. Common in cultivation.

13. Levisticum (Riv.) Hill

1. **L.** OFFICINALE (L.) Koch. LOVAGE.

A weed by roadsides, the soil requirements not known; infrequent. Fr. July 15–Sept.

E. slope of Ball Hill, Danby; toward Saxon Hill (*D.*); West Hill, two miles from Ithaca; beyond Geer Gulf (Coy Glen) (*D.*, and *Coulter & Rose*); near McKinneys (*D.*); King Ferry (*D.*).

Vt. to Pa. Naturalized from Eu.

In Britton and Brown's Ill. Fl., the generic name Hipposelinum (Daler.) Britton & Rose is employed, but without comment.

[**Anethum** (Tourn.) L.]

[**A.** GRAVEOLENS L. DILL.

Occasional about the C .U. campus and on the Ithaca flats, in rich waste soil, but not established.

Native of Eu. Seeds accidentally scattered.]

14. **Heracleum** L.

1. **H. lanatum** Michx. COW PARSNIP.

Roadsides and stream banks, in rich alluvial or gravelly, mostly slightly calcareous, soils; infrequent. Fr. July.

"Not uncommon up the Neguaena valley to Newfield" (*D.*!); Spencer St., toward Buttermilk Glen; Renwick woods; Indian Spring marsh (*D.*); e. of Freeville; Salmon Creek valley; and elsewhere.

Lab. to Alaska, southw. in the mts. to Ga., Nev., Kans., Utah, and Calif.; rare or absent on the Atlantic Coastal Plain. A northern species.

15. **Imperatoria** (Tourn.) L.

1. **I.** OSTRUTHIUM L. MASTERWORT.

In an old orchard one-half mile s. of North Spencer station, 1915. Fr. July.

Escaped from cultivation and locally established in the eastern U. S. Native of Eu.

16. **Conioselinum** Fisch.

1. **C. chinense** (L.) BSP. (*Selinum Canadense* of Cayuga Fl.) HEMLOCK PARSLEY.

Wet shaded cliffs in ravines, and in swamps and boggy woods, in calcareous soils; frequent. Fr. Sept. 15–Oct.

Michigan Hollow Swamp (*D.*!); Enfield Glen; Coy Glen; Cascadilla Glen (*D.* in C. U. Herb.); Fall Creek, below Beebe Lake; "in all larger glens" (*D.*); Fir Tree Swamp, Freeville (*D.*!); Mud Creek, Freeville (*D.*!); McLean Bogs (*D.*!); Beaver Brook (*D.*!).

Newf. to Minn., southw. to Pa., Ind., and in the mts. to N. C.; infrequent or rare on the Coastal Plain.

17. **Angelica** L.

a. Leaflets thick, small, 2.5 cm. wide or less; stems rather slender, pubescent above; umbels and fruit pubescent. 1. *A. villosa*

a. Leaflets thin, large, 3–7 cm. wide; stems very stout, usually purple, glabrous; umbels and fruit glabrous; petioles much dilated. 2. *A. atropurpurea*

1. **A. villosa** (Walt.) BSP. (*Archangelica hirsuta* of Cayuga Fl.)

Dry sandy or gravelly open woodlands, in the more acid soils; frequent. Fr. Sept.–Oct.

In the ericaceous-chestnut soils of the hills w., s., and s. e. of Ithaca, on the crests of the ravines, and in the sandy regions n. of Cayuga Lake: pinnacles of Caroline (*D.*) and Danby (*D.*!); Newfield hills; Connecticut Hill; Enfield Glen; Coy Glen; South Hill, near the marsh; s. w. shore of Cayuga Lake; "Casc. Woods and near all the ravines" (*D.*); Renwick slope; Turkey Hill (*D.*); sandy woods e. of Newton Ponds. Absent in the McLean region and on the clays and richer soils back from the lake shores.

W. Mass. to Minn., southw. to Fla., Tenn., and Mo.; frequent on the Coastal Plain.

2. **A. atropurpurea** L. (*Archangelica atropurpurea* of Cayuga Fl.) ANGELICA.

Low thickets and borders of swamps, in rich alluvial soils; frequent. Fr. June–July.

Inlet Valley and Inlet Marshes (*D.*!); "Cayuga Lake shore, often in sand" (*D.*); Dwyer Pond; Mud Creek, Freeville (*D.*); McLean Bogs; Beaver Brook (*D.*); and elsewhere.

Newf. to Minn., southw. to Del., Ill., and Iowa; rare or absent on the Coastal Plain.

18. Daucus (Tourn.) L.

1. **D.** CAROTA L. CARROT. QUEEN ANNE'S LACE.

A weed in dry grassy fields and waste places, along roadsides, and in creek beds, in run-out noncalcareous soils of sand, gravel, or even heavy clay; common. June–Sept.

Native of Eurasia; widely distributed in nearly all parts of N. A.

A serious pest in hayfields. The garden carrot is an improved form of this species.

98. CORNACEAE (DOGWOOD FAMILY)

a. Flowers 4-merous, perfect; upper pair of leaf veins arising low down and extending parallel to the midrib. 1. CORNUS

a. Flowers 5-merous, polygamo-dioecious; veins normal. 2. NYSSA

1. Cornus (Tourn.) L.

a. Inflorescence capitate, surrounded by a large 4-leaved white petaloid involucre.
- *b*. Plant low, 0.5–2 dm. high, subherbaceous; leaves crowded, pseudoverticillate. 1. *C. canadensis*
- *b*. Plant arborescent; leaves opposite. 2. *C. florida*

a. Inflorescence cymose, without an involucre.
- *b*. Leaves opposite.
  - *c*. Leaves oval, thinly woolly beneath; branches olive or pale green or suffused with purple, speckled or streaked with darker purple; fruit light blue or nearly white. 3. *C. rugosa*
  - *c* Leaves ovate to elliptical or lanceolate, with scattered hairs beneath, or glabrous; branches not normally speckled.
    - *d*. Branches purplish or red; cymes flat or slightly convex.
      - *e*. Pubescence of the peduncles and young twigs loose; leaves narrowly ovate or elliptical; branches dull purple or greenish purple, with tawny pith; fruit pale blue. 4. *C. Amomum*
      - *e*. Pubescence of the peduncles and young twigs appressed or wanting; leaves generally broadly ovate and more acuminate; branches brighter purple or red, with white pith; fruit white. 5. *C. stolonifera*
    - *d*. Branches gray; cymes very convex or subpaniculate. 6. *C. candidissima*
- *b*. Leaves alternate, clustered; fruit deep blue. 7. *C. alternifolia*

1. **C. canadensis** L. DWARF CORNEL. BUNCHBERRY.

Damp or boggy, also dry, sterile woodlands and banks, in gravelly, probably always acid, soils, usually under conifers; frequent. June–July 10.

Frequent in the dry woods of the higher hilltops of Danby, Newfield, Caroline, and Dryden; Dry Run, Spencer; swamp w. of Key Hill; sphagnum meadow n. w. of Enfield Falls; Danby swamps (*D.*!); Fall Creek, near the iron footbridge (*D.*); w. of Varna (*D.*); Ellis Hollow (*D.*); Dart Woods (*D.*); Ringwood; Freeville swamps (*D.*); Beaver Brook; arbor vitae swamp e. of Clyde; and elsewhere.

Lab. to Alaska, southw. to N. J., W. Va., Ind., Minn., Colo., and Calif. Found also in e. Asia.

2. **C. florida** L. FLOWERING DOGWOOD.

Dry sandy, gravelly, or rocky woodlands, mostly in acid soils; frequent. May.

Generally distributed in the upland woods on the hills w., s., and s. e. of Ithaca, on the ravine crests, and along the cliffs of the Cayuga Lake shore; absent in the McLean district and on the clays and richer soils.

S. Me. and Ont. to s. Minn., southw. to Fla. and Tex., including the Coastal Plain.

3. **C. rugosa** Lam. (*C. circinata* of Gray's Man., ed. 7, and of Cayuga Fl.) ROUND-LEAVED DOGWOOD.

Dry gravelly or rocky open woodlands, thickets, and banks, often in clay, in neutral or slightly acid soils; frequent. June 10–30.

Fairly common on the hills w., s., and s. e. of Ithaca, along the ravines, and on the cliffs of Cayuga Lake shore; absent on the calcareous gravels of the McLean region, on the richer soils, and apparently also on the more acid soil of ericaceous-chestnut woodlands.

E. Que. to Man., southw. to Va., Ind., Ill., Iowa, and N. Dak.; rare or absent on the Coastal Plain.

Lamarck's *C. rugosa* is clearly this species, and antedates by two years *C. circinata* L'Her. (See publications by Wangerin, Britton and Brown, Schneider, and Rehder.)

4. **C. Amomum** Mill. (*C. sericea* of Cayuga Fl.) SILKY DOGWOOD. KINNIKINNIK.

Low grounds in alluvial or gravelly soils, without apparent relation to lime, but not actually in peat bogs; common. June 15–July 10, and often again July 25–Aug. 5.

Newf. to N. Dak., southw. to Fla., La., and Tex.; fairly common on the Coastal Plain.

5. **C. stolonifera** Michx. RED OSIER DOGWOOD.

Low grounds and springy upland places, in gravelly or sandy, more or less calcareous, soils; common, and generally distributed in the soils indicated. May 25–June 15, and often again July 25–Aug. 5.

Lab. to Mackenzie, southw. to Va., Ky., Iowa, Nebr., N. Mex., Ariz., and Calif.; rare or absent on the Atlantic Coastal Plain.

Sometimes united with *C. alba* L., but, though closely related, the differences are sufficient to warrant the recognition of both species for the present. The form with yellow twigs (var. *flaviramea* Spaeth) has escaped to roadsides north of Enfield Falls.

6. **C. candidissima** Marsh. (*C. paniculata* of Gray's Man., ed. 7, and of Cayuga Fl. *C. racemosa* of Bailey's Man. Cult. Pl.)

Dry or damp thickets, fence rows, and hillsides, in gravelly or alluvial, mostly neutral, soils often with a slight mixture of clay; common. June 25–July.

Common about Ithaca, but somewhat less so in the residual soils on the hills.

Cent. Me. to Ont. and Minn., southw. to N. C., Tenn., and Nebr.; less common on the Coastal Plain.

Until it is decided whether *C. foemina* Mill. was *C. paniculata* L'Her. or the southern *C. stricta*, that name is to be avoided. *C. candidissima* Marsh., the next oldest name, is valid under the International Rules.

7. **C. alternifolia** L. f. ALTERNATE-LEAVED DOGWOOD.

Damp thickets and ravine banks, in gravelly or stony soils with little reference to lime content; common. June.

Newf. to Minn., southw. to Ga., Ala., and Mo.; frequent along the coast.

2. Nyssa L.

1. **N. sylvatica** Marsh. (*N. multiflora* of Cayuga Fl.) BLACK GUM. SOUR GUM. PEPPERIDGE. TUPELO.

Low woodlands and also in drier upland woods, in various noncalcareous, mostly gravelly, soils; scarce. June.

S. of Lick Brook; South Hill, toward Caroline (*D.*); s. of Coy Glen and Hardenburg Gulf (*D.*); Six Mile Creek, n. of Wells Falls (*D.*); Chickaree Woods, formerly; n. of Beebe Lake (*D.*!); Fall Creek, toward Varna; 1½ miles s. of Kennedy Corners; w. shore of Cayuga Lake (*D.*); e. shore of the lake, in Lansing (*D.*); w. side of Cayuga and Montezuma Marshes (*D.*!); absent in the McLean region.

S. Me. and n. Vt. to Mich., southw. to Fla. and Tex.; common on the Coastal Plain.

99. ERICACEAE (HEATH FAMILY)[27]

a. Ovary superior.
  b. Plant saprophytic, without green color; pollen grains simple; anthers dehiscing by vertical or transverse, often terminal, slits; fruit a capsule. 1. Subfamily MONOTROPOIDEAE
  b. Plant with green foliage; pollen grains compound.
    c. Anthers inverted, dehiscing by basal (apparently apical) pores; corolla polypetalous; fruit a capsule; low evergreen herbs. 2. Subfamily PYROLOIDEAE
    c. Anthers erect, dehiscing by apical pores, rarely by vertical slits; corolla gamopetalous, rarely polypetalous; fruit a capsule or a berry; habit various. 3. Subfamily ERICOIDEAE
a. Ovary inferior; pollen grains compound; corolla gamopetalous; green plants of diverse habit. 4. Subfamily VACCINIOIDEAE

1. Subfamily *Monotropoideae*

a. Corolla polypetalous, with connivent petals; anthers peltate, opening across the top, awnless. 1. MONOTROPA
a. Corolla gamopetalous, ovoid or subglobose; anthers vertically dehiscent, awned on the back. 2. PTEROSPORA

2. Subfamily *Pyroloideae*

a. Leaves lanceolate or oblanceolate, scattered; flowers corymbose or umbellate; style very short; valves of the capsule with smooth edges. 3. CHIMAPHILA
a. Leaves suborbicular or elliptical, basal; style long.
  b. Flowers racemose; valves of the capsule with cobwebby margins. 4. PYROLA
  b. Flowers solitary; valves of the capsule with smooth margins. 5. MONESES

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[27] Whether the Ericaceae should be considered a single family or be divided into Clethraceae, *Pyrolaceae*, *Monotropaceae*, *Ericaceae*, and Vacciniaceae, is a much-discussed question. It would seem that science is best served by the broader interpretation. These subdivisions are all similar in having several carpels, two whorls of stamens, and a tendency toward apical dehiscence of the anthers. In all but one group the pollen grains are compound. The differences, on the other hand, are of minor importance, and the important characters interchange so that there are no sharp division lines between the groups: for instance, in the case of the Vaccinioideae the inferior ovary would naturally indicate a wide divergence from other types, but the corolla, the anthers, and other characters are distinctly ericaceous. Several of the subdivisions include, at most, but one or two genera, and there is therefore no opportunity to determine whether these subdivisions form homogeneous and distinct groups. It is rather a case of generic differences within a phylogenetically old family where differences are naturally greater than in those families which are more homogeneous and more recent.

3. Subfamily *Ericoideae*

a. Corolla in outline funnel-form or saucer-shaped; fruit a septicidal capsule.
  b. Corolla polypetalous; flowers white, from scaly buds; leaves woolly beneath. 6. LEDUM
  b. Corolla gamopetalous; flowers usually pink or purple; leaves not woolly.
    c. Corolla without staminal pockets; flowers from scaly buds. 7. RHODODENDRON
    c. Corolla with staminal pockets; flowers not from scaly buds. 8. KALMIA
a. Corolla urceolate or salver-form; fruit a loculicidal capsule or a berry.
  b. Corolla urceolate; anthers with terminal pores.
    c. Plant erect, 30–180 cm. high; fruit capsular.
      d. Sepals imbricated; anthers not awned on the back; flowers in foliaceous-bracted, terminal racemes; leaves evergreen. 9. CHAMAEDAPHNE
      d. Sepals valvate; flowers in closer clusters; bracts not foliaceous.
        e. Anthers awned on the back; leaves evergreen. 10. ANDROMEDA
        e. Anthers naked on the back; leaves deciduous. 11. LYONIA
    c. Plant erect, 3–15 cm. high; leaves evergreen; fruit a false berry (see also 3d *c*). 12. GAULTHERIA
    c. Plant prostrate; leaves evergreen; fruit a berry. 13. ARCTOSTAPHYLOS
  b. Corolla salver-form; anthers opening vertically; plant prostrate; leaves oval, evergreen. 14. EPIGAEA

4. Subfamily *Vaccinioideae*

a. Ovary half inferior; anther cells not prolonged into tubes; trailing plants. 15. CHIOGENES
a. Ovary wholly inferior; each anther cell prolonged into a tube; erect or trailing plants.
  b. Ovary 4–5-celled, many-seeded; foliage not resinous-dotted. 16. VACCINIUM
  b. Ovary 10-celled, 10-seeded; foliage resinous-dotted. 17. GAYLUSSACIA

1. **Monotropa** L.

a. Flowers solitary; style very short and broad. 1. *M. uniflora*
a. Flowers racemose; style longer than the ovary. 2. *M. Hypopitys*

1. **M. uniflora** L. INDIAN PIPE. CORPSE PLANT.

Saprophytic on humus under various species of trees, in dry or moist woodlands, on calcareous or noncalcareous gravels; fairly common. July–Aug.

Generally distributed throughout the basin, except perhaps in the clays and alluviums and in the richer soils back from the shores of Cayuga Lake.

Newf. to B. C., southw. to Fla. and Mex., including the Atlantic Coastal Plain. Found also in e. Asia.

2. **M. Hypopitys** L. (Including *M. lanuginosa* Michx.) PINE-SAP.

Saprophytic on slightly acid humus in dry woods, mainly of oak and chestnut, on noncalcareous gravels; occasional. July–Aug.

Mainly w., s., and e. of Ithaca, along the shores of Cayuga Lake, and on the sands n. of the lake; rare or absent in the McLean region, and on the clays and richer soils back from both sides of the lake.

Que. to B. C., southw. to Fla., La., and Mex.; less frequent on the Atlantic Coastal Plain. Found also in Eurasia.

All the material is apparently the hairy extreme, *M. lanuginosa* Michx. *M. uniflora* and *M. Hypopitys* are often separated as two distinct genera, the generic differences being in styles, anthers, and some other parts. The perianth and the

general appearance, however, indicate a generic unity. In a family where the differences are in general more marked than usual, it seems best to retain these species in one genus.

2. **Pterospora** Nutt.

1. **P. andromedea** Nutt. PINE DROPS.

Saprophytic under pines and in mixed woods, in light sandy or gravelly non-calcareous soils; rare. July 10–Aug. 10.

Caroline, slope of North Pinnacle, 1885 (*O. F. Pearce*); West Danby, slope of Thatcher Pinnacles (*D.*); Enfield Glen, 1919; woods, n. side of Buttermilk Glen (*F. H. Severance, 1878; F. V. Coville*); *Coy* Glen, *1874* (*D.*); Taughannock Gorge, s. side, 1882 (*F. C. Curtice*).

P. E. I. to B. C., southw. to Pa., Mich., Mex., and Calif.; rare or absent on the Atlantic Coastal Plain.

In Gray's *Manual*, ed. 7, this plant is attributed to "hard clay soil," but the local stations certainly do not indicate this type of soil. It is also said there to be "parasitic apparently on the roots of pines," though generally it is considered to be a saprophyte, and its root system is that of a typical saprophyte.

3. **Chimaphila** Pursh

a. Leaves oblanceolate, green throughout. 1. *C. umbellata*, var. *cisatlantica*

a. Leaves oblong-lanceolate or lanceolate, variegated with white. 2. *C. maculata*

1. **C. umbellata** (L.) Bart., var. **cisatlantica** Blake. (See Rhodora 19: 241. 1917.) PRINCE'S PINE. PIPSISSEWA.

Dry woods, in light sandy acid soil with chestnut and oak, very rarely in woods of maple and beech; frequent. July 5–20.

On the hills w., s., and e. of Ithaca, along the cliffs of Cayuga Lake, and in the sands n. of the lake; apparently absent or nearly so in the McLean region and on the clays and richer soils back from the lake shores.

N. S. to Ga., westw. to the Pacific coast, including the Atlantic Coastal Plain. Found also in Mex. and Eurasia.

2. **C. maculata** (L.) Pursh. SPOTTED PRINCE'S PINE.

In situations similar to the preceding; rare. July 10–30.

"East shore of Cayuga L., *Ledyard, 1827,* (*in Herb. J. J. Thomas, 'very rare.'*)" (*D.*); East Lansing (*F. B. Hine* in C. U. Herb.); w. shore of Cayuga Lake, in Bates Woods (*D.*).

Me. (?) and Mass. to Ont. and Minn., southw. to Ga. and Miss., including the Coastal Plain.

4. **Pyrola** (Tourn.) L.

a. Styles straight; petals connivent; racemes secund. 1. *P. secunda*

a. Styles declined; petals spreading; racemes not secund.

b. Calyx lobes ovate-triangular.

c. Leaves oblong-elliptical, thin, dull; anthers blunt. 2. *P. elliptica*

c. Leaves orbicular, thick, often glossy; anthers with neck or point.

d. Blade small, 1–2.5 cm. wide, shorter than the petiole; flowers greenish white. 3. *P. chlorantha*, var. *paucifolia*

d. Blade larger, 2–5 cm. wide, about equaling the petiole; flowers pink. 4. *P. asarifolia*, var. *incarnata*

b. Calyx lobes oblong; leaves orbicular, thick, glossy; flowers white. 5. *P. rotundifolia*, var. *americana*

1. **P. secunda** L. SECUND SHINLEAF.

Dry or damp woods and slopes, often under evergreens, in sandy or gravelly, somewhat acid, soils; frequent. June 25–July 15.

Connecticut Hill; Key Hill; Enfield Glen; Coy Glen; Caroline hills; Six Mile Creek; Turkey Hill; Ringwood; Mud Creek, Freeville; absent on the clays and richer soils.

Lab. to Alaska, southw. to Md., Mich., Nebr., and Calif.; apparently rare on the Atlantic Coastal Plain. Found also in Eurasia.

Dudley cites "*P. secunda*, L., var. *pumila*, in Paine's Cat., p. 187" as found "in the Fir-Tree swamp at Freeville." A specimen in the C. U. Herbarium collected by Dudley in that swamp on September 15, 1880, and labeled as above, is a small form of *P. secunda*, and not var. *obtusata* Turcz. (var. *pumila* Gray) as this variety is now understood.

2. **P. elliptica** Nutt. SHINLEAF.

Dry or damp sandy or gravelly woods, in neutral or somewhat acid soils; fairly common. July 5–25.

Common on the hills s. and e. of Ithaca, along the shores of Cayuga Lake, and in the sands n. of the lake; less common in the McLean region and in the clays and richer soils on both sides of the lake.

Newf. to B. C., southw. to D. C., Ill., Iowa, and N. Mex.; infrequent or rare on the Atlantic Coastal Plain.

Anthers orange in this species, not pale as in *P. americana*.

3. **P. chlorantha** Swartz, var. **paucifolia** Fernald. (See Rhodora 22: 51. 1920.) SHINLEAF.

Under evergreens, in ravines and on damp hummocks around swamps, on noncalcareous gravels and crests; scarce. June 10–July 5.

Enfield Glen; near Besemer; Cascadilla woods; Fall Creek and elsewhere (*D.*); Ellis Hollow; Ringwood; e. of Turkey Hill; Esty Glen; Wyckoff Swamp.

N. S. to w. Ont., southw. to n. N. E. and Pa. This variety apparently absent on the Coastal Plain.

4. **P. asarifolia** Michx., var. **incarnata** (Fisch.) Fernald. (*P. rotundifolia*, var. *uliginosa*, of Cayuga Fl.) SHINLEAF.

Calcareous bogs; rare. June 15–July 10.

On the Ontario Plain: Wayne Co. (*Sartwell*, D.); tamarack swamp s. e. of Savannah (*L. Griscom, F. P. Metcalf, & A. H. Wright*); arbor vitae swamp s. w. of Westbury (*F. P. Metcalf, P. A. Munz, & K. M. W.*); swampy hemlock woods n. of Miller Bog, Spring Lake (*Griscom, Metcalf, & Wright*).

Newf. to Alaska, southw. to Vt., cent. N. Y., Wis., Colo., and Calif. Found also in Asia.

5. **P. rotundifolia** L., var. **americana** (Sweet) Fernald. (See Rhodora 22: 122. 1920. *P. rotundifolia* of Cayuga Fl.) SHINLEAF.

Dry woodlands, in sandy and gravelly neutral or acid soils, usually with chestnut; fairly common. July 10–30.

Frequent on the hills w., s., and e. of Ithaca, along the cliffs of Cayuga Lake, and on the sands n. of the lake; rare or absent in the McLean district and on the clays and richer soils back from the lake shores.

P. E. I. to S. Dak., southw. to Ga. and Ohio, including the Coastal Plain.

5. **Moneses** Salisb.

1. **M. uniflora** (L.) Gray. ONE-FLOWERED SHINLEAF.

Under evergreens in deep damp woods, in gravelly soil, the lime preference not determined; rare. June 15–30.

Near Ludlowville, formerly (*H. B. Lord, D.*); knoll near Ellis Hollow Swamp, under hemlocks, formerly (*D.*). Not seen in recent years.

Lab. to Alaska, southw. to Pa., Mich., Minn., Colo., and Oreg.; rare or absent on the Atlantic Coastal Plain. Found also in Eurasia.

6. Ledum L.

1. **L. groenlandicum** Oeder. (*L. latifolium* of Cayuga Fl.) LABRADOR TEA.

In peat bogs; scarce. June 1–20.

Woodwardia Bog (*D.!*); Malloryville Bog (*D.!*); McLean Bogs (*D.!*); bog e. of Duck Lake; Crusoe Lake swamp.

Arctic regions, southw., chiefly inland, to Pa., Mich., and Wis.

7. Rhododendron L.

a. Leaves thin, deciduous; corolla funnel-form; stamens conspicuously exserted. 1. *R. nudiflorum*, var. *roseum*

a. Leaves coriaceous, evergreen; corolla short-funnel-form; stamens scarcely exserted. 2. *R. maximum*

1. **R. nudiflorum** (L.) Torr., var. **roseum** (Loisel.) Wiegand. (See Rhodora **20**: 53, 1918, and **26**: 4, 1924. *R. canescens* of Gray's Man., ed. 7, as to northern plants. *R. nudiflorum* of Cayuga Fl.) PINK AZALEA. PINXTER FLOWER.

Dry sandy or gravelly open woods and thickets, in acid soils, also in swamps; frequent. May, in the swamps two to three weeks later.

On the hills w., s., and e. of Ithaca, along the cliffs of Cayuga Lake, and in the sands n. of the lake; absent in the dry woods of the McLean district and on the clays and richer soils back from the lake shores. Swamp stations: Headwaters Swamp; Michigan Hollow (*D.*); Ringwood; Dryden-Lansing Swamp (*D.*); Malloryville Bog.

N. H. to N. Y., southw. along the mts. to Fla. and La.

Rehder, in his recent revision of the azaleas (Monog. Azalea, by Wilson & Rehder, Pub. Arnold Arboret. no. 9: 138. 1921), has treated this variety as a distinct species under the name *R. roseum* (Loisel.) Rehder. After an inspection of a large number of specimens it seems impossible to follow Rehder, since all the characters given by him as distinguishing *R. nudiflorum* from this plant apparently break down. It is best, therefore, to treat the plant as a variety.

2. **R. maximum** L. GREAT LAUREL.

Mucky soil, in damp rocky or gravelly neutral or acid locations; rare. July 10–30.

Michigan Hollow Swamp, abundant over a restricted area (*D.!*); woods along Dry Run about two miles n. w. of North Spencer, 1915 (*A. J. E. & L. H. MacDaniels*).

Que. (?), N. S., Me., and Ont., southw. to Ga.; rare northw. A plant of the Allegheny Mts. Central N. Y. is near the northern limit of this plant, which is abundant in the mts. from Pa. southw.

8. Kalmia L.

a. Leaves mostly alternate, 5–12 cm. long, green beneath, nearly flat; twigs nearly terete. 1. *K. latifolia*

a. Leaves opposite, 1–4 cm. long, glaucous-white beneath, revolute; twigs 2-edged. 2. *K. polifolia*

1. **K. latifolia** L. MOUNTAIN LAUREL.

Damp sandy or gravelly, often rocky, slopes, in acid soils; scarce. June 10–July 10.

Locally abundant on the hills s. of Ithaca, rare in the ravines near the city: hills w. of Spencer and North Spencer; Newfield hills (*D.*); high hills of West Danby (*D.!*); hills near White Church (*D.!*); Enfield Glen; Cascadilla woods, formerly (*D.*); Fall Creek, near the iron footbridge. Not found in the McLean region or n. of Ithaca.

N. B. to Ont., southw. to Fla. and La.; very abundant in the mts. from Pa. to N. C.; less frequent on the Coastal Plain.

2. **K. polifolia** Wang. BOG LAUREL.

Peat bogs; rare. June–July.

Duck Lake bogs, 1916 and 1923.

Lab. to Alaska, southw. to N. J., Pa., Mich., and Calif.

[**K. angustifolia** L. SHEEP LAUREL.

Credited to Ithaca by Dr. Bradley in Paine's Cat., and to Junius in Sartwell's Herb. Not since seen at either of these stations or elsewhere in the basin.]

9. Chamaedaphne Moench

1. **C. calyculata** (L.) Moench. (*Cassandra calyculata* of Cayuga Fl.) LEATHER-LEAF. CASSANDRA.

In peat bogs, often forming the "vanguard" of vegetation around the bog lakes; frequent. Apr. 15–May 15.

In nearly all the peat bogs in the basin: McLean Bogs (*D.!*); Chicago Bog (*D.!*); Woodwardia Bog (*D.!*); Malloryville Bog; Dryden Lake (*D.!*); Lake Como (Locke Pond, *D.*); Junius bogs (*D.!*); and elsewhere.

Lab. to Alaska, southw. to Ga., Ill., Wis., Minn., and B. C., including the Atlantic Coastal Plain. Found also in Eurasia.

10. Andromeda L.

1. **A. glaucophylla** Link. (*A. polifolia* of Cayuga Fl.) ANDROMEDA. BOG ROSE-MARY.

In peat bogs; scarce. May 20–June 15.

Michigan Hollow; Chicago Bog (*D.!*); McLean Bogs (*D.!*); Malloryville Bog (*D.!*); Junius peat bogs (*Sartwell, D.!*); Featherbed Bog; Duck Lake; Otter Lake.

Lab. to Man., southw. to N. J., Pa., and Minn.

11. Lyonia Nutt.

1. **L. ligustrina** (L.) DC. (*Andromeda ligustrina* of Cayuga Fl.) MALE BERRY.

Low sandy acid soils about swamps; rare. June 15–July 10.

South Hill, in the marsh (*D.!*) and one-fourth mile south of survey station 420 (*D.!*).

Me. to cent. N. Y., southw. to Fla. and Tex. A plant of the Coastal Plain, penetrating inland to central N. Y. in localities where the proper combination of soil and moisture is found; more frequent toward Binghamton and the Catskill Mts.

12. Gaultheria (Kalm) L.

1. **G. procumbens** L. AROMATIC WINTERGREEN. CHECKERBERRY.

Dry or moist sandy or peaty acid soils in woods and clearings; common. July.

Abundant on the hills w., s., and e. of Ithaca, and on the rocks along the shore of Cayuga Lake; frequent about the bogs of the McLean district and at Junius; rare in the clays and richer soils.

Newf. to Man., southw. to Ga., Ind., and Mich., including the Coastal Plain.

13. **Arctostaphylos** Adans.

1. **A. Uva-ursi** (L.) Spreng., var. **coactilis** Fernald & MacBride. (See Rhodora 16:212. 1914. *A. uva-ursi* of Cayuga Fl.) BEARBERRY.

Dry exposed sandy or gravelly acid soils; rare. May.

Six Mile Creek, nearly extinct (*D.*); Taughannock Gorge, on rocks n. side above the falls (*D.*!); roadside, Connecticut Hill.

Arctic regions, southw. to N. J., Pa., and Mo.; most abundant on the northern Coastal Plain.

14. **Epigaea** L.

1. **E. repens** L. TRAILING ARBUTUS. MAYFLOWER.

Damp or rather dry sandy or gravelly acid soils, usually with chestnut; common. Apr. 15–May 10.

Abundant on the hills of Spencer, Danby, Caroline, and parts of Dryden; occasional in the ravines and on the rocky shores of Cayuga Lake near Ithaca, and in the sands n. of the lake; absent in the McLean region and in the clays and richer soils back from the lake shore.

Newf. to Sask., southw. to Fla., Ky., and Mich., including the Coastal Plain.

A form with the corolla lobes sharply reflexed occurs on the hills at North Spencer.

15. **Chiogenes** Salisb.

1. **C. hispidula** (L.) T. & G. MOXIE PLUM. CAPILLAIRE. CREEPING SNOWBERRY.

On hummocks, logs, and stumps, in more or less calcareous sphagnum swamps; scarce. May 15–30.

Fir Tree Swamp, Danby (*D.*); Brookton Springs (*D.*); Mud Creek, Freeville (*D.*!); Malloryville Bog (in C. U. Herb., collector unknown); Wyckoff Swamp (*D.*); Westbury Bog (*L. Griscom, F. P. Metcalf, & A. H. Wright*).

Lab. to B. C., southw. to N. C., Mich., and Minn.; infrequent on the Coastal Plain.

16. **Vaccinium** L.[28]

a. Corolla plainly gamopetalous, 5-toothed or 5-lobed; plants with deciduous leaves.
  b. Corolla open-campanulate, strongly 5-lobed; anthers 2-awned on the back, exserted; fruit greenish. 1. *V. stamineum*
  b. Corolla urceolate or cylindraceous, 5-toothed; anthers awnless, included; fruit blue-black.
    c. Habit dwarf; plants of dry soil (except often no. 4); leaves 2–4.5 cm. long; corolla short-cylindrical, 4–7 mm. long.
      d. Leaves glabrous, or hairy on the midrib only; twigs pubescent only in lines.
        e. Blade elliptic-lanceolate, acute at each end, green on both sides, finely serrulate. 2. *V. pennsylvanicum*
        e. Blade elliptic-oval or obovate, acute or obtuse, glaucous especially beneath, entire or rarely serrulate. 3. *V. vacillans*
      d. Leaves downy, at least on the under side, entire; twigs very pubescent. 4. *V. canadense*
    c. Habit taller, 1–4 m. high; plants normally of wet soil, rarely in dry situations; leaves 4–8 cm. long; corolla usually long-cylindrical, 6–9 mm. long
      d. Leaves entire.
        e. Leaves more or less pubescent. 5. *V. corymbosum*
        e. Leaves glabrous. 5a. *V. c.*, var. *glabrum*
      d. Leaves serrulate, pubescent or nearly glabrous. 5b. *V. c.*, var. *amoenum*

[28] A polymorphic genus clearly set off from related genera by good structural characters. Its members fall into several natural subgenera or sections, which by many botanists are considered separate genera.

a. Corolla almost polypetalous, rotate, 4-parted; plants trailing, evergreen.
b. Leaves acute; stems not prolonged beyond the flowers and fruit; pedicels with 2 narrow colored bracts; lobes of the corolla 5–6 mm. long.
6. *V. Oxycoccus*
b. Leaves obtuse; stems prolonged beyond the flowers and fruit; bracts broad and herbaceous; lobes of the corolla 6–10 mm. long. 7. *V. macrocarpon*

1. **V. stamineum** L. DEERBERRY. SQUAW HUCKLEBERRY.

Dry sandy or gravelly open woods in noncalcareous soils, and on the leached-out crests of cliffs; rather common. May–June.

Common on the hills w., s., and e. of Ithaca, on the cliffs along the shores of Cayuga Lake, and on the sandy soils n. of the lake; absent in the McLean region and on the clays and richer soils back from the lake shores.

Mass. to Minn., southw. to Fla., Ky., and La.; but unexpectedly infrequent or rare on the Coastal Plain.

2. **V. pennsylvanicum** Lam. EARLY UPLAND BLUEBERRY.

Distribution as in the preceding species or in more acid soils, rarely also in swampy tracts; common. Apr. 25–May; fr. July.

Newf. to Sask., southw. to Va., Ill., and Wis., including the Coastal Plain.

Dudley cites *V. pennsylvanicum* Lam., var. *nigrum* Wood, as occurring on the North Pinnacle, Caroline. A specimen in the C. U. Herbarium from that locality, presumably collected by Dudley (July 19, 1882) and labeled in his handwriting "*Vaccinium pennsylvanicum* (Lam.)—fruit (black)," is a black-fruited form of the ordinary *V. pennsylvanicum,* not var. *nigrum* Wood as that variety is now understood.

3. **V. vacillans** Kalm. LATE UPLAND BLUEBERRY.

Distribution as in the preceding species, but occasionally in slightly calcareous soils; common. May; fr. Aug.

In addition to its normal occurrence in noncalcareous soils, this species has been found near Chicago Bog, an unexpected station.

N. S. to Mich., southw. to Ga., Tenn., and Kans., including the Coastal Plain.

4. **V. canadense** Kalm. SOUR-TOP OR VELVET-LEAF BLUEBERRY.

In peat bogs, in dry sandy acid soils, or on noncalcareous rocky crests; scarce. June.

McLean Bogs (*D.*!); Malloryville Bog (*D.*!); Lake Como (Locke Pond, *D.*); Woodwardia Bog; dry rocky crests of Taughannock Gorge above the falls, 1904 (*E. M. Cipperly & K. M. W.*); rocky crest of Shurger Glen (*L. H. MacDaniels & K. M. W.*).

Lab. to Man., southw. in the mts. to Va. and Ill.

Flowers generally smaller than in *V. pennsylvanicum.*

5. **V. corymbosum** L. SWAMP, TALL, OR HIGH BLUEBERRY.

In or near acid or calcareous bogs, rarely in dry sandy acid soil; frequent. May 25–June.

Headwaters Swamp; Michigan Hollow; Key Hill swamp; swamp n. of upper Enfield Glen; South Hill Marsh; Ellis Hollow; e. of Dryden Lake; Woodwardia Bog; McLean Bogs; Beaver Brook; Junius ponds; and elsewhere.

N. S. to Minn., southw. to Va. and La., chiefly eastw., including the Coastal Plain.

Dudley, in the *Cayuga Flora,* lists *V. corymbosum,* var. *atrococcum* Gray, from Larch Meadow and the Dryden marshes. The identity of Dudley's plants is uncertain. It has not been possible to recognize *V. atrococcum* as a distinct species, or even as a variety, in central N. Y. *V. corymbosum* as here understood varies greatly as to

length of corolla and size of leaves at flowering time, as well as in shape and pubescence of leaves, but these variations do not seem to be correlated in any way. In South Hill Marsh there are many plants having the appearance of a hybrid between *V. corymbosum* and various dwarf species.

5a. **V. corymbosum** L., var. **glabrum** Gray. (Gray's Man., ed. 2, p. 250, 1856, and Synopt. Fl.)

In situations similar to the preceding.

With the typical form in most of the bogs: Michigan Hollow; South Hill Marsh; Malloryville Bog; McLean Bogs; and elsewhere.

Range same as that of the typical form.

5b. **V. corymbosum** L., var. **amoenum** (Ait.) Gray.

In situations similar to the preceding; infrequent.

Small pond near Enfield Falls; Michigan Hollow Swamp; e. of Dryden Lake; Malloryville Bog.

Mainly in the Middle Atlantic States (*Gray*); N. S. (*Fernald*).

6. **V. Oxycoccus** L. SMALL CRANBERRY.

Boggy acid soils with sphagnum, chiefly on the moor of peat bogs; infrequent. June–July.

Freeville (*Dr. Jordan, D.*); Malloryville Bog (*D.*!); McLean Bogs (*D.*!); Summit Marsh (*D.*); Junius peat bogs (*D.*!); Featherbed Bog.

Arctic regions, southw. to Pa., Mich., and Wis., including the northern Coastal Plain. Found also in Eurasia.

Only the typical form has been found in the Cayuga Lake Basin.

7. **V. macrocarpon** Ait. LARGE CRANBERRY.

In acid bogs, but also in more marly places; infrequent. July–Aug.

Sedgy and boggy calcareous moor of Mud Pond, McLean Bogs; Chicago Bog; Junius peat bogs; sedgy moor of Stark Pond.

Newf., Lake Erie, and Wis., southw. to N. J., W. Va., and Ark., including the Coastal Plain.

Along the coast this plant often grows on sand.

17. Gaylussacia HBK.

1. **G. baccata** (Wang.) K. Koch. (*G. resinosa* of Cayuga Fl.) BLACK HUCKLEBERRY.

Dry open woods and thickets, in sandy or gravelly acid or even neutral soils, also in peat bogs especially in sandy regions; frequent. May.

On the hills w., s., and e. of Ithaca, on the crests of the ravines and cliffs along the shores of Cayuga Lake, and in the sands n. of the lake; absent in the McLean region and on the clays and richer soils back from the lake shores. *Bog stations:* Headwaters Swamp; South Hill Marsh (*D.*!); Woodwardia Bog (*D.*!); Newton Ponds (*D.*); Junius peat bogs.

Newf. to Man., southw. to Ga., Ill., and Wis., including the Coastal Plain.

Apparently in shaded places the leaves may become broader and more obtuse.

100. PRIMULACEAE (PRIMROSE FAMILY)

a. Plant acaulescent; lobes of the corolla imbricated, pink. 1. PRIMULA

a. Plant leafy-stemmed.

b. Ovary half inferior; lobes of the corolla imbricated, white. 2. SAMOLUS

b. Ovary superior; lobes of the corolla convolute.

c. Capsule vertically dehiscent; flowers yellow or white.

d. Flowers yellow, axillary or in terminal or axillary racemes.

e. Staminodia 0; anthers oblong or oval; lobes of the corolla convolute; leaves dotted. 3. LYSIMACHIA
e. Staminodia present; anthers linear; each lobe of the corolla wrapping around its stamen in the bud; leaves not dotted. 4. STEIRONEMA
d. Flowers white, appearing terminal; staminodia 0. 5. TRIENTALIS
c. Capsule transversely dehiscent; flowers axillary, scarlet or rarely white. 6. ANAGALLIS

1. Primula L.

1. **P. mistassinica** Michx. CANADIAN PRIMROSE.

Damp limy shaded ledges on cliffs; rare. May 10–30.

Fall Creek Gorge, s. side below Triphammer Falls (*D.*!); Taughannock Gorge, s. side below the falls (*D.*!). Discovered many years ago (see Dudley's *Cayuga Flora*), fluctuating in abundance from year to year. Found elsewhere in N. Y. State: Fish Creek, Annsville (*Knieskern & Vasey*); deep ravine at head of Keuka Lake (*Sartwell*); cliffs at Portage (*Clinton*); Salmon River ravine, Orwell (*Rowlee*).

Newf. to Sask., southw. to Vt., N. Y., Mich., Wis., and Minn.

2. Samolus (Tourn.) L.

1. **S. floribundus** HBK. (*S. Valerandi*, var. *americanus*, of Cayuga Fl.) WATER PIMPERNEL. BROOKWEED.

Muddy places about the marshes and in alluvial fields at lake level, less commonly on dripping rocks, apparently requiring lime or salt; occasional. July.

Lick Brook (*D.*); alluvial flats, lighthouse road, Ithaca; woods s. e. of Sherwood (*D.*); limestone falls in brook s. of Goodwin (Taughannock) Point (*D.*); alluvial fields, Myers Point and Big Gully Point; Paine Creek; Big Gully; Cayuga and Montezuma Marshes (*D.*!); salt flats n. e. of Montezuma village; open swamp n. e. of Mud Pond, Conquest; mucky woods n. of Duck Lake; and elsewhere.

Widespread in temperate and tropical America, mostly in saline or alkaline situations.

3. Lysimachia (Tourn.) L.

a. Flowers axillary or in terminal racemes.
b. Plant erect; leaves lanceolate; corolla 1–1.5 cm. in diam., with dark spots or streaks.
c. Leaves whorled; flowers axillary. 1. *L. quadrifolia*
c. Leaves opposite; flowers all in a terminal raceme, with smaller bracts. 2. *L. terrestris*
b. Plant creeping; leaves round-ovate; corolla 2–3 cm. in diam., not streaked. 3. *L. Nummularia*
a. Flowers in dense axillary spikes. 4. *L. thyrsiflora*

1. **L. quadrifolia** L. YELLOW LOOSESTRIFE.

On dry scrubby or wooded slopes with oak and chestnut, in sandy or gravelly noncalcareous soils; frequent. June 15–July 15.

On the hills w., s., and e. of Ithaca, along the shores of Cayuga Lake, and in the sandy country n. of the lake; rare or absent in the McLean district and on the clays and richer soils back from the lake shores.

N. B. to Minn., southw. to Ga. and Mo., including the Coastal Plain.

2. **L. terrestris** (L.) BSP. (*L. stricta* of Cayuga Fl.) YELLOW LOOSESTRIFE.

Alluvial mucky and sandy swales and marshes, in both calcareous and noncalcareous regions; frequent. July.

Newf. to Man., southw. to Ga. and Ark., including the Coastal Plain.

A form with the leaves occasionally subverticillate, the raceme more leafy-bracted, and the lower flowers in the axils of normal leaves (apparently *L. producta* (Gray)

Fernald), occurs in a boggy thicket at the McLean Bogs (*L. H. MacDaniels & A. J. E.*). This appears like a hybrid between *L. terrestris* and *L. quadrifolia*, but as the latter species is absent from the vicinity of the McLean Bogs it is more likely an extreme of *L. terrestris*.

3. **L.** NUMMULARIA L. MONEYWORT. YELLOW MYRTLE.

On damp banks in low woods, along ditches, and in ravines, mostly in rich alluvial soils; frequent, and becoming more common. June 20–July 20.

Near Enfield Falls and one mile n. (*D.*); Six Mile Creek; Renwick woods; Beebe Lake; n. e. of Freeville; Fall Creek, at several stations; Lockwood Flats, rather abundant (*D.*); Union Springs; and elsewhere. Not clearly a calciphile, though usually not escaping in strongly siliceous regions.

Newf. to Mich., southw. to N. J., Va., and Ill. Cultivated from Eu. and now naturalized.

4. **L. thyrsiflora** L. TUFTED LOOSESTRIFE.

In shallow or often deeper water among reeds and sedges, in mucky or peaty soil with little apparent relation to lime content; frequent. June.

Summit Marsh (*D.*!); Danby, swamp on the Sabin farm (*D.*); swale near Enfield Falls; Cayuta Lake (*D.*); marsh near Renwick; Dryden-Lansing Swamp (*D.*); Bear Swamp (*D.*); McLean Bogs (*D.*); Chicago Bog; Black Lake; marshy moor of Vandemark Pond; Miller Bog, Spring Lake; Westbury Bog.

Que. to Sask. and Alaska, southw. to Pa., Ill., Mo., and Calif. Found also in Eu.

Miss M. E. Allen (Rhodora 22: 193. 1920) has shown that the character relating to the staminodia, on which this species is often separated as a distinct genus, breaks down completely.

4. Steironema Raf.

1. **S. ciliatum** (L.) Raf. FRINGED LOOSESTRIFE.

Borders of marshes and low thickets, in rich alluvial, somewhat calcareous, soils; common. July–Aug. 15.

N. S. to B. C., southw. to Ga., Ala., Kans., N. Mex., and Ariz.; rare on the Atlantic Coastal Plain.

5. Trientalis (Rupp.) L.

1. **T. borealis** Raf. (See Rhodora 11: 236. 1909. *T. americana* of Cayuga Fl.) STARFLOWER.

In the humus of damp or sheltered woodlands and ravines, in both calcareous and noncalcareous regions, more abundant under conifers; frequent. May 20–June 20.

About most of the swamps and bogs of the basin and in the deeper woods of the higher hills: North Spencer; West Danby; Michigan Hollow; Enfield Glen; Caroline Pinnacles; around McLean Bogs; Beaver Brook; and elsewhere.

Lab. to Man., southw. to Va. and Ill., including the Coastal Plain.

6. Anagallis (Tourn.) L.

1. **A.** ARVENSIS L. SCARLET PIMPERNEL. POOR MAN'S WEATHERGLASS.

In cultivated fields, in light soils; scarce, and apparently not well established. June–Sept.

By railroad s. of Caroline Depot, 1875 (*D.*); dry open field s. w. of the upper reservoir, Buttermilk Glen, 1916; low cornfield e. of cemetery, Judd Falls, abundant, 1916 (*F. P. Metcalf*).

Newf. to Minn., southw. to Fla., Mex., and the Pacific coast. Adventive from Eurasia.

101. OLEACEAE (OLIVE FAMILY)

a. Fruit a samara; flowers mostly apetalous and dioecious; leaves pinnate. 1. FRAXINUS
a. Fruit a capsule; flowers petaliferous, perfect; corolla salver-form; leaves ovate, simple. 2. SYRINGA
a. Fruit a drupe; flowers petaliferous, perfect; corolla funnel-form or tubular; leaves lanceolate or oblong, simple. 3. LIGUSTRUM

1. Fraxinus (Tourn.) L.

a. Lateral leaflets short-stalked, commonly 6, elliptic-lanceolate to oval; anthers linear; calyx present in the pistillate flowers; fruit tapering below, the body terete.
 b. Body of fruit not wing-margined; leaflets elliptic-oval; plant glabrous. 1. *F. americana*
 b. Body of fruit wing-margined, at least above; leaflets elliptic-lanceolate.
  c. Foliage and shoots velvety-pubescent. 2. *F. pennsylvanica*
  c. Foliage and shoots glabrous. 2a. *F. pennsylvanica*, var. *lanceolata*
a. Lateral leaflets almost or quite sessile, commonly 10, lanceolate, more closely serrate, glabrous; anthers short-oblong or cordate; calyx wholly absent; fruit *of equal breadth at both ends, the body flat.*
 b. Leaf rhachis tomentose at base of leaflets; buds dark brown. 3. *F. nigra*
 b. Leaf rhachis glabrous; buds black. 4. *F. excelsior*

1. **F. americana** L. WHITE ASH.

Dry rich upland woods and hedgerows, in the richer, somewhat calcareous, soils and on the clays; common. May 10–20.

Generally distributed throughout the basin, but less frequent on the noncalcareous soils of the higher hills, lake cliffs, and ravine crests.

N. S. to Minn., southw. to Fla. and Tex.; infrequent on the Coastal Plain.

2. **F. pennsylvanica** Marsh. (*F. pubescens* of Cayuga Fl.) RED OR DOWNY ASH.

Rich alluvial soils, especially along the shores of Cayuga Lake; frequent. May 10–30.

Summit Marsh (*D.*!); Larch Meadow and roadsides near by (*D.*!); Negundo Woods (*D.*); on most of the points along Cayuga Lake (*D.*!); Frontenac Island (*D.*); Scipioville; Canoga and Cayuga Marshes (*D.*!). Dudley mentions specimens transitional to var. *lanceolata* found at Sheldrake, Lake Ridge, Fleming Schoolhouse, and Summit Marsh. Such intermediate plants are occasional.

Me. to N. Dak., southw. to Fla. and Tex.; infrequent on the Coastal Plain.

The fruits of this and other species of Fraxinus vary greatly in width. Individuals of this species with extremely narrow fruits correspond to *F. Darlingtonii* Britton.

2a. **F. pennsylvanica** Marsh., var. **lanceolata** (Borkh.) Sarg. (*F. viridis* of Cayuga Fl.) GREEN ASH.

Habitat similar to the preceding; occasional.

Summit Marsh; Myers Point; Farley Point (*D.*!); shore s. of Union Springs (*D.*); Cayuga Junction. Trees on the C. U. campus near Triphammer Bridge were probably planted.

Range nearly that of the typical form.

3. **F. nigra** Marsh. (*F. sambucifolia* of Cayuga Fl.) BLACK ASH.

Low woods and especially in swamps, rarely on uplands; common in some places. May 1–20.

Near Enfield Falls; Michigan Hollow; Fir Tree Swamp, Danby; Beebe Lake; Ellis Hollow; Ringwood, abundant; McLean Bogs; Salmon Creek; Montezuma Marshes. Drier localities: by the campus brook (*D.*); Cascadilla Creek, at Dwyer Pond; Forest Home; Chickaree Woods; McGowan Woods.

Newf. to Man., southw. to Va. and Ark.; infrequent on the Coastal Plain.

4. **F.** EXCELSIOR L. EUROPEAN ASH.

An occasional escape from cultivation, in ravines and woods adjoining C. U. campus. Native of Eu.

2. Syringa L.

1. **S.** VULGARIS L. COMMON LILAC.

Spreading from cultivation especially around old buildings, the soil preference not known. May.

Me. and N. H. to N. Y. and Pa. Native of Eu.

3. Ligustrum (Tourn.) L.

1. **L.** VULGARE L. COMMON PRIVET.

Thickets, apparently in light acid soils. June–July.

"Several places along the top of the cliffs south of Levanna" (*D.*); edge of woods at Esty Glen; cliffs n. of Sheldrake.

Me. to Ont. and N. C.; escaped from cultivation. Native of Eurasia.

102. GENTIANACEAE (GENTIAN FAMILY)

a. Leaves *opposite, sessile, simple*; *corolla not* valvate.
  b. Leaves green, not reduced to scales; stems not filiform; corolla tubular or salver-form, the lobes convolute.
    c. Flowers large, 1.5–5 cm. long, blue (rarely white); anthers straight; style short and stout, or wanting. 1. GENTIANA
    c. Flowers small, 1–1.3 cm. long, pink; anthers spiral; style slender. 2. CENTAURIUM
  b. Leaves scale-like, awl-shaped; stems filiform; corolla campanulate, the lobes imbricated; flowers very small, white. 3. BARTONIA
a. Leaves alternate, petioled, trifoliolate; corolla valvate, fringed. 4. MENYANTHES

1. Gentiana (Tourn.) L.

a. Corolla without plaits, lobes, or teeth in the sinuses; annuals or biennials.
  b. Corolla very large, 3.5–5 cm. long, open-salver-form, its lobes fringed; peduncles long. 1. *G. crinita*
  b. Corolla smaller, 1.5–2 cm. long, broadly tubular, its lobes not fringed; peduncles short. 2. *G. quinquefolia*
a. Corolla with plaits or lobes in the sinuses; perennials.
  b. Margins of leaves and sepals ciliate.
    c. Corolla nearly truncate at summit, the narrow lobes almost obsolete; margins of the conspicuous plaits minutely fimbriate-dentate. 3. *G. Andrewsii*
    c. Corolla with broad rounded lobes 2-8 mm. long; margins of the less conspicuous plaits entire or nearly so.
      d. Leaves ovate-lanceolate, acuminate; involucre of 4–6 leaves, the outer ones 5–10 cm. long; calyx lobes herbaceous, oblong to obovate, spreading; corolla closed. 4. *G. clausa*
      d. Leaves oblong or elliptical, acute or obtuse; involucre of 2–4 leaves, the outer ones 3–6.5 cm. long; calyx lobes firm, linear-oblanceolate, ascending; corolla distinctly open. [*G. Saponaria*]
  b. Margins of leaves and sepals not ciliate, smooth. 5. *G. linearis*

1. **G. crinita** Froel. FRINGED GENTIAN.

Open springy and marly meadows and slopes; rare. Sept. 1–Oct. 15.

"*Ithaca*" (*herb. of J. J. Thomas,* D.); Cascadilla Creek (*D. S. Jordan, D.*); in marl spring, n. side of Cascadilla Glen between Central and Stewart Aves., formerly; near site of windmill, Stewart Ave. n. of University Ave., formerly (*D.*); Fall Creek, marl spring w. of Dryden-Ithaca town line; Sherwood (*Miss Howland & Mrs. Brun,* D.); sandy roadside three miles n. of Geneva; Lowery Ponds (*D.*!). The species fluctuates much in abundance, and may be absent in some seasons. At the Fall Creek station it grows in company with the rare *Pedicularis lanceolata,* as it is said to do in N. J. (*Stone*).

Cent. Me. to N. Dak., southw. to Ga., Ohio, and Iowa; infrequent on the Coastal Plain.

2. **G. quinquefolia** L.

Springy or dry gravelly banks, in somewhat acid, apparently also in slightly calcareous, soils; generally scarce though locally abundant. Sept. 1–Oct. 15.

Abundant in dry open scrubland near Dart Woods, Ball Hill (Danby), Thatcher Pinnacles, and elsewhere on the higher hills (*D.*!); abundant e. side of upper reservoir, Buttermilk Glen; upper Coy Glen; above Potter Falls; Cascadilla Glen, s. of Eddy Pond (*D.*!); Fall Creek (*D.*); Taughannock Gorge, s. side (*D.*); below Sheldrake (*D.*); Big Gully (*D.*); and elsewhere.

S. Me. to Ont. and Mich., southw. to Fla. and Mo.; rare or absent on the Coastal Plain.

3. **G. Andrewsii** Griseb. CLOSED GENTIAN.

Moist sandy or gravelly thickets and banks on the Ontario plain; rare. Aug. 25–Sept.

Utt Point and on the lake shore southw.; roadside n. w. of Marengo (*K. M. W., A. J. E., & L. F. Randolph*).

Occasional in Que. and Mass., and from N. Y. to the Selkirk Mts., southw to Md., Mo., and Nebr.

4. **G. clausa** Raf. (See Rhodora **19**: 147. 1917. *G. Andrewsii* of Cayuga Fl.) CLOSED GENTIAN.

Moist gravelly banks and damp thickets, in nearly neutral soils; scarce. Aug. 25–Oct. 10.

E. side of Spencer Lake; swamp, West Danby; Fir Tree Swamp, Danby; Bald Hill, Caroline; South Hill, beyond the "Incline," 1874 (*D.*); Fleming Meadow (*D.*); Dryden Lake valley (*D.*); Malloryville Bog; Myers Point, n. of Salmon Creek (*D.*).

Cent. Me. to n. and w. N. Y., southw. mainly in the mts. to N. C.

[**G. Saponaria** L.

Dudley reports this species from Pony Hollow, but a specimen of his in the C. U. Herbarium from this station and labeled *G. Saponaria* is *G. clausa.* Furthermore, Pony Hollow is outside the Cayuga Lake Basin. Dudley cites also a specimen from "'Ledyard' (*Herb. J. J. Thomas.*)". It is very doubtful that the latter was *G. Saponaria,* since the gentian known at two stations along the Ledyard shore is *G. Andrewsii. G. Saponaria* is a southern species, chiefly of the Coastal Plain, reaching this region very rarely.]

5. **G. linearis** Froel.

Bogs and springy places.

A specimen in Herb. J. J. Thomas from Junius (*D.*); not seen since.

N. B. to Minn., southw. in the interior to N. Y. and Md.

2. Centaurium Hill

1. C. UMBELLATUM Gilib. CENTAURY.

Roadsides and fields, in gravelly or sandy soils of unknown lime content; rare. June–Sept.

Sandy field s. of Pout Pond, Junius, 1919 (*A. J. E., K. M. W., & L. F. Randolph*). (For other N. Y. stations for this rare weed, see House, Bul. N. Y. State Mus. 254. 1924.)

N. S. and Que., southw. to Mass., N. Y., and Ill. Adventive from Eu.

3. Bartonia Muhl.

1. **B. virginica** (L.) BSP. (*B. tenella* of Cayuga Fl.)

In damp places, frequently about bogs, but rarely in sphagnum, mostly in acid sandy soils; scarce. July 25–Sept. 5.

Hummocks in swampy field, w. edge of Malloryville Bog; "Junius" (in Sartwell Herb., *D.*); sandy edge of marl bogs along path e. of Lowery Ponds, and path along w. edge of Pout Pond; springy places about Botrychium Woods and Miller Bog, Spring Lake; edge of Featherbed Bog.

N. S. to Minn., southw. to Fla. and La., including the Coastal Plain.

4. Menyanthes (Tourn.) L.

1. **M. trifoliata** L. BUCKBEAN.

Very wet and springy soils, both calcareous and noncalcareous; scarce. May 20–30.

Summit Marsh (*D.*!); one-half mile above Enfield Falls; Freeville (*D.*); Malloryville (*D.*!); Mud Pond, McLean Bogs (*D.*!); near Chicago Bog (*D.*!); Junius (*D.*); s. e. corner of Conquest Township.

Greenland and Lab. to Alaska, southw. to N. J., Pa., Nebr., and Calif. Found also in Eurasia.

103. APOCYNACEAE (DOGBANE FAMILY)

a. Plant trailing; corolla salver-form, blue, hairy in the throat but not appendaged. 1. VINCA

a. Plant erect; corolla campanulate, color white, cream, or pink, appendaged within. 2. APOCYNUM

1. Vinca L.

1. V. MINOR L. PERIWINKLE. (*Incorrectly called "Myrtle."*)

Roadsides and banks, escaped from cultivation; occasional near yards and cemeteries. May–June.

Established in Enfield Glen below the falls (*D.*!); Lick Brook; and elsewhere.

Ont., Mass., and N. Y., to Ga. Naturalized from Eu.

2. Apocynum (Tourn.) L.

a. Flowers paniculate; the main axis of the plant forking and thus soon disappearing; corolla 6–7 mm. long, pink, the lobes revolute; sepals much shorter than the corolla tube; stem leaves broadly ovate; leaves of the branches oval, pubescent beneath. 1. *A. androsaemifolium*

a. Flowers corymbose; the main axis of the plant conspicuous, plainly overtopped by the branches; corolla 2.5–4 mm. long, greenish white, the lobes erect; sepals equaling the corolla tube; stem leaves oblong or oblong-ovate; leaves of the branches oval-lanceolate or narrower, glabrous or pubescent.

b. Cauline leaves oblong-lanceolate, very short-petioled, rounded, truncate, or slightly cordate at base; venation irregular; branch leaves elliptic-lanceolate, often narrowly so; corolla 2.5–2.9 mm. long; sepals 1–1.5 mm. long; follicles 6–12 cm. long. 2. *A. cannabinum*

b. Cauline leaves oblong, more often obtuse, almost or quite sessile and clasping by a cordate base; venation closer and more pinnate; branch leaves longer, oval-lanceolate; corolla 2.9–4 mm. long; sepals 2–3 mm. long; follicles 12–17 cm. long.

c. Foliage glabrous. 2a. *A. cannabinum*, var. *hypericifolium*

c. Foliage pubescent. 2b. *A. cannabinum*, var. *pubescens*

1. **A. androsaemifolium** L. SPREADING DOGBANE. WANDERING MILKWEED.

Dry sandy or gravelly thickets and clearings, in slightly calcareous or noncalcareous soils; common, and generally distributed. June 20–July.

Newf. to B. C., southw. to Ga., Mo., and Ariz., including the Atlantic Coastal Plain.

2. **A. cannabinum** L. INDIAN HEMP.

Gravelly shores of lakes and streams, rare or absent in noncalcareous soils; common. July.

Occurring in great profusion on gravel bars in streams of the basin and on gravelly beaches along Cayuga Lake.

Newf. to Wis., southw. to Ala., Miss., and Kans., including the Coastal Plain.

The leaves of this plant are nearly always glabrous.

2a. **A. cannabinum** L., var. **hypericifolium** (Ait.) Gray. INDIAN HEMP.

Gravelly or sandy banks near streams or ponds, usually in finer and richer soil than the preceding; common, at least at lake level. June 20–July.

Railroad, near Lick Brook; near mouth of Buttermilk Glen; Red Mills; Union Springs; Cayuga Bridge; edge of Salt Pond w. of Howland Island; border of Crusoe Prairie; marly moor of Newton and Lowery Ponds.

Que. to Sask. and B. C., southw. to w. Me., cent. N. Y., Ohio, and Colo.; infrequent or scarce on the Atlantic Coastal Plain.

2b. **A. cannabinum** L., var. **pubescens** (R. Br.) DC.

In situations similar to the preceding; scarce.

Railroad bank s. of Buttermilk Creek; marly moor of Lowery Ponds.

R. I. to Ont. and Iowa, southw. to Ala. and Mo.; frequent on the Coastal Plain.

In various localities in the Cayuga Lake Basin are found plants which answer to *A. Milleri* Britton, to *A. urceolifer* Miller, and possibly to *A. medium* Greene. In certain places, as for example along the rocky lake shore near Portland Point and Atwater, great masses of such forms occur. These forms, though constant in each locality, differ considerably in the different localities. In every instance they seem to combine characters found in *A. androsaemifolium* and *A. cannabinum*, but to present no new characters themselves. It seems wise at present to consider them of hybrid origin. Two principal types have been noted, as follows:

(*a*) A form approaching *A. urceolifer* Miller, with long sepals equaling the tube of the corolla, and with glabrous foliage: gravelly bank by pumping station, Six Mile Creek (*E. L. Palmer*, also *A. J. E. & L. H. MacDaniels*).

(*b*) A form approaching *A. Milleri* Britton, with short sepals and glabrous leaves: shale cliffs s. of Portland Point; shale talus along cliffs n. of Atwater.

In both forms the corolla is distinctly more pinkish or more nearly pure white than in the greenish-white-flowered *A. cannabinum* and its varieties.

104. ASCLEPIADACEAE (MILKWEED FAMILY)

a. Stem erect; crown of 5 hooded bodies with a horn in each. 1. ASCLEPIAS
a. Stem twining; crown a fleshy 5–10-lobed ring or disk. 2. CYNANCHUM

1. Asclepias (Tourn.) L.

a. Flowers orange; leaves alternate; juice not milky. 1. *A. tuberosa*
a. Flowers purple, lavender, or greenish; leaves opposite or whorled; juice milky.
b. Leaves closely pinnately veined; flowers dull pale purple; follicles echinate 2. *A. syriaca*
b. Leaves irregularly veined; flowers various; follicles smooth.
c. Flowers large, greenish; corolla lobes 6–9 mm. long; pedicels in fruit deflexed; plant tall, with large, broad, pointed leaves. 3. *A. phytolaccoides*
c. Flowers smaller, purple or lavender; corolla lobes 4–6 mm. long; pedicels erect; plant lower.
d. Hoods purple; leaves opposite; rather tall plants of swamps. 4. *A. incarnata*
d. Hoods white; leaves usually whorled; low slender woodland plants. 5. *A. quadrifolia*

1. **A. tuberosa** L. BUTTERFLY WEED. PLEURISY-ROOT.

Dry sandy and loamy banks, rarely in sandy shale talus, usually if not always in noncalcareous soils; infrequent. July.

"Casc. Cr., Fall Cr., and all the ravines" (*D.*); "abundant on Cayuga L. shore, McKinney's to Aurora" (*D.*); near Valley Cemetery, s. of Ithaca; Coy Glen; Cayuga Heights; occasional along e. side of Cayuga Lake; around the ponds and bogs at Junius. By no means so abundant as Dudley would imply.

N. H. to Minn., southw. to Fla., Tex., and Ariz., including the Coastal Plain.

2. **A. syriaca** L. (*A. Cornuti* of Cayuga Fl.) COMMON MILKWEED.

Pastures and roadsides, in rich sandy or gravelly loam; common. July.

Absent only on the noncalcareous, more residual, soils of the uplands and lake cliffs of the basin.

N. B. to Sask., southw. to Ga. and Kans., including the Coastal Plain.

3. **A. phytolaccoides** Pursh. POKE MILKWEED.

Open woodlands and borders of thickets, in gravelly noncalcareous soils; occasional. July.

Caroline hills; between West Danby and Danby; Connecticut Hill; n. of Enfield Falls; w. of Cayuta Lake; Coy Glen; Cascadilla Glen, near the Girls' Playground; Forest Home Drive; Ellis Hollow; Turkey Hill; Ringwood; and elsewhere.

Me. to Minn., southw. to Ga. and Ark.; infrequent or rare on the Coastal Plain.

4. **A. incarnata** L. SWAMP MILKWEED.

Marshes and stream banks, in alluvial soil; common. June 25–Aug. 10.

N. B. to Sask., southw. to W. Va., Tenn., La., and Colo.; occasional or rare on the Coastal Plain.

The var. *pulchra* (Ehrh.) Pers. was said by Dudley to occur "rarely." This was probably an error, as it has not been seen in recent years, and is, in fact, a plant of the Coastal Plain unlikely to be found in central N. Y. Forms of *A. incarnata* with the flowers pale, like those of var. *pulchra*, are occasional.

5. **A. quadrifolia** Jacq.

Dry open woodlands and thickets, in sandy or stony noncalcareous soils; frequent June 5–30.

Frequent on the hills and ravine crests w., s., and e. of Ithaca, along the cliffs of Cayuga Lake, and in the sand n. of the lake; rare or absent in the McLean region and on the clays and richer soils back from the lake shores.

N. H. to Ont. and Minn., southw. to N. C. and Ark.; rare on the Coastal Plain. Forms with leaves all in pairs are occasional.

2. Cynanchum L.

1. **C. VINCETOXICUM** (L.) Pers.

Low sandy woods and banks; rare. June–Sept.

Big Gully, 1919 (*L. F. Randolph*); Big Gully Point, 1918; abandoned quarry n. e. of Farley Point; wood road e. of Westbury Bog.

Mass. and Vt. to Pa. and Ohio. Introduced from Eu.

The plants included above agree with European and American specimens of *C. Vincetoxicum* as to size of flowers, length of sepals, glabrous corolla, and petioles pubescent on the under side as well as on the upper side, but they have dark purple flowers.

105. CONVOLVULACEAE (MORNING-GLORY FAMILY)

a. Plants with green leaves; corolla large, funnel-form, showy.
  b. Stigmas capitate; calyx without subtending bracts. [IPOMOEA]
  b. Stigmas linear or oblong; calyx with or without large bracts. 1. CONVOLVULUS
a. Plants without green leaves, yellowish or flesh-colored, parasitic; corolla very small, campanulate, short-cylindrical or globose, whitish. 2. CUSCUTA

[Ipomoea L.]

a. Corolla almost or quite salver-form, red; stamens and style exserted. [*I. coccinea*]
a. Corolla funnel-form, color purple, blue, or white; stamens and style included.
  b. Leaves 3-lobed; flowers 2.5–4.5 cm. long. [*I. hederacea*]
  b. Leaves entire; flowers 4.5–7 cm. long. [*I. purpurea*]

[**I. COCCINEA** L.

"Was growing, in 1885, in a large mass by the old road crossing the marsh to the steamboat landing" (*D.*); not seen in recent years.

S. w. U. S. and tropical Am. Naturalized northeastw.]

[**I. HEDERACEA** Jacq. (*I. Nil* of Cayuga Fl.)

"Occasionally seen with the preceding [*I. purpurea*]" (*D.*); not found recently. Waste and cultivated ground: Me. to Nebr., southw. to Fla. and Mex. Introduced from tropical Am.]

[**I. PURPUREA** (L.) Lam. COMMON MORNING-GLORY.

Springs up frequently in waste places and about garbage dumps, but is not established. July–Aug.

Escaped from cultivation in e. N. A. Introduced from tropical Am.]

1. Convolvulus (Tourn.) L.

a. Calyx inclosed by two large bracts; stigmas oval or oblong.
  b. Stem low, erect; leaves broadly oblong; petioles not more than one-fourth the length of blade; bracts narrowed at base. 1. *C. spithamaeus*
  b. Stem twining or trailing; leaves triangular-ovate or oblong-ovate; petioles longer; bracts broad and usually cordate at base.

c. Flowers double; leaves subhastate; plant escaped from cultivation. 2. *C. japonicus*
c. Flowers single; leaves cordate in outline; plant native.
d. Foliage practically glabrous. 3. *C. sepium*
d. Foliage downy. 3a. *C. sepium*, var. *pubescens*
a. Calyx bractless at base; stigmas filiform. 4. *C. arvensis*

1. **C. spithamaeus** L.

Dry gravelly or rocky banks and talus, often in open woods, in subneutral soils; infrequent. June–July 15.
Thatcher Pinnacles (*D.*); *Enfield Glen* (*D.*!); *hillside near* Lick Brook; Coy Glen; Thurston Ave., Cornell Heights; Fall Creek (*D.*); the "Nook" (*D.*!); talus near Esty; Taughannock (*D.*); Cayuga Lake shore, n. of King Ferry (*D.*).
N. S. to Man., southw. to Fla. and Ky.; rare or absent on the Coastal Plain.

2. **C.** JAPONICUS Thunb.

Dry soil about walls and in waste places; scarce. July 15–Aug.
South Ave. near Stewart Ave., Ithaca; Forest Home; and elsewhere.
Occasionally cultivated, and escaped from cultivation. Native of Asia.

3. **C. sepium** L. HEDGE BINDWEED. WILD MORNING-GLORY.

Gravelly strands, alluvial banks, and shale talus; common. July–Aug.
Especially abundant around Inlet and Cayuga Marshes, and in the talus along the shore of Cayuga Lake; less frequent elsewhere.
N. S. to B. C., southw. to N. C., Kans., and N. Mex., including the Atlantic Coastal Plain. Found also in Eurasia.

3a. **C. sepium** L., var. **pubescens** (Gray) Fernald.

Dry open fields, in light soils; rare.
Top of hill e. of Inlet, Ithaca-Newfield town line.
E. Que. to Fla., and rarely about the Great Lakes.

4. **C.** ARVENSIS L. FIELD BINDWEED.

Cultivated and waste places, in gravelly soils; infrequent. June 20–July.
Railroad embankment at East Ithaca; E. State St., Ithaca, beyond the city line; Linden Ave. (Hazen St., *D.*); C. U. campus, along South Ave.; circus common, s. of Percy Field (*D.*!); Central N. Y. Southern R. R., near Esty; near Westbury Bog.
N. S. to Ont., Mont., and Wash., southw. to N. J., Kans., Nebr., N. Mex., and Calif. Naturalized from Eu.
Often a very serious pest.

2. Cuscuta (Tourn.) L.

a. Stigmas elongated; capsule regularly circumscissile by a thickened transverse joint; calyx lobes acute; flower 5-merous.
b. Corolla campanulate, the lobes triangular, acute; stamens exserted; calyx close, with triangular lobes. [*C. Epithymum*]
b. Corolla short-urceolate, the lobes ovate-triangular, obtuse; stamens included or nearly so; calyx very large, almost enveloping the very depressed flower, the lobes broadly ovate. 1. *C. Epilinum*
a. Stigmas capitate; capsule indehiscent; calyx lobes acute or obtuse; flowers 4- or 5-merous.
b. Lobes of the corolla acute, inflexed; calyx lobes acute or obtuse.

c. Corolla remaining at base of capsule; lobes 5, not markedly thickened or papillose; calyx lobes very broad, obtuse, coarsely cellular. [*C. pentagona*]
c. Corolla capping the capsule; lobes usually 4, thickened and cellular-papillose; calyx lobes triangular, acute, indistinctly cellular. 2. *C. Coryli*
b. Lobes of the corolla obtuse, erect or spreading; calyx lobes obtuse.
c. Corolla tube cylindrical, capping the capsule, the lobes 4; capsule depressed-globose, thin-walled, slightly or not at all glandular; flowers in rather loose clusters. 3. *C. Cephalanthi*
c. Corolla tube campanulate, surrounding or rarely capping the capsule, the lobes 5; capsule globose-conic but obtuse, the wall thickened at summit, strongly and coarsely glandular-spotted; flowers in loose or dense clusters. 4. *C. Gronovii*

[**C.** EPITHYMUM Murr. CLOVER DODDER.

On clover, alfalfa, and other leguminous plants, generally in cultivated fields.

Not yet reported from the Cayuga Lake Basin, but frequent near by, at Geneva, N. Y. Native of Europe.]

1. **C.** EPILINUM Weihe. FLAX DODDER.

Parasitic on cultivated flax; frequent where flax is grown.

On farms e. of Owasco Lake, frequent (*F. L. Kilborne,* D.); rarely in flax fields between Cayuga and Seneca Lakes (*D.*).

N. S. to N. J., N. Y., Pa., and Ohio. Introduced from Eu.

[**C. pentagona** Engelm. (See Yuncker, Univ. Ill. Biol. Monog. 6, nos. 2–3, p. 50. 1921. *C. arvensis* of Gray's Man., ed. 7.)

On various low plants.

Not yet reported from the Cayuga Lake Basin, but to be sought on the Ontario plain.

Mass. to Minn. and Calif., southw. to Fla., Miss., and Mex.

A plant primarily of the Atlantic Coastal Plain and the Mississippi Valley, but collected at De Kalb in St. Lawrence Co. (*O. P. Phelps,* no. 1191), at Industry in Monroe Co. (*J. H. Howard* in C. U. Herb.), and in Rockland Co. (*C. F. Austin*).]

2. **C. Coryli** Engelm. (*C. inflexa* of Cayuga Fl.)

Dry hillsides and thickets; scarce. Aug.–Sept.

Hillside near White Church, on daisies and Ceanothus (*D.*); West Danby, by the hill road near Thatcher Pinnacles (*D.*); Fall Creek, on asters and Solidago (*D.*); n. of Beebe Lake, on *Desmodium nudiflorum* (*K. M. W.* in C. U. Herb.).

R. I. and N. Y. to S. Dak., southw. to Va. and Ark., Tex., and Ariz.; rare on the Coastal Plain.

Apparently a rare speoies in N. Y. State, about ten stations having been reported.

3. **C. Cephalanthi** Engelm. (*C. tenuiflora* of Cayuga Fl.)

Gravelly shores; rare. Aug.–Sept.

Farley Point, on *Aster paniculatus* and *Salix longifolia*; Union Springs, on *Mentha piperita* (*D.*); Montezuma, in meadows n. e. of village, abundant on *Aster paniculatus* (*D.*); strand of Seneca River at Howland Island, on *Aster paniculatus* (*L. F. Randolph, A. J. E., & K. M. W.*); Cayuga Lake, 1895 (*Wiegand,* according to Yuncker).

Me. to Oreg., southw. to Va., Tenn., Tex., and Ariz.; occasional on the Coastal Plain in N. J. The stations in the Cayuga Lake Basin are at the northern edge of the range of this species.

The inflorescence is looser than that of *C. Gronovii.*

4. C. Gronovii Willd. COMMON DODDER.

Low grounds, especially about marshes; frequent. Aug.–Sept.

White Church; West Danby; Enfield Glen; Coy Glen; Inlet Marshes; Fall Creek; Salmon Creek; Montezuma Marshes; Spring Lake; Junius; and elsewhere. Growing on various plants.

N. S. to Man., southw. to Fla., Tex., and Ariz., including the Coastal Plain.

The perianth and the ovary are usually plainly glandular, and the terminal translucent glands on the ovary are often large and conspicuous, which is not the case in *C. Cephalanthi.* The plant is apparently all var. *vulgivaga* Engelm., and according to Engelmann this is the typical form of Willdenow.

106. POLEMONIACEAE (PHLOX FAMILY)

1. Phlox L.[29]

a. Plant erect or diffusely spreading; leaves ovate-lanceolate or oblong, 2–5 cm. long. 1. *P. divaricata*

a. Plant forming prostrate mats; leaves subulate or linear, 0.5–1.5 cm. long. 2. *P. subulata*

1. P. divaricata L. BLUE PHLOX.

Rich woodlands, thickets, and ravine banks, in alluvial, clayey or loamy, more or less calcareous, soils; frequent. May–June 15.

Absent on the more residual acid soils of the hilltops s. of Ithaca; rare in the gravels of the McLean district.

W. Que. to Minn., southw. to Fla. and La.; rare or absent on the Coastal Plain and in the Piedmont area.

2. P. subulata L. GROUND OR MOSS PINK.

In gravelly, stony, or rocky thin soil, the lime requirements unknown; abundant in certain localities. May.

Crests of most of the ravines of the basin (*D.*!); cliff crests along the shores of Cayuga Lake (*D.*!); brow of South Hill (*D.*!); high hills of Danby and Caroline (*D.*); rare or absent in the McLean region and on the clays and richer soils back from the lake shores.

N. Y. and N. J. to Mich., southw. to Fla. and Ky.; less abundant on the Coastal Plain.

The large patches are very showy when in flower.

107. HYDROPHYLLACEAE (WATER-LEAF FAMILY)

1. Hydrophyllum (Tourn.) L.

a. Leaves pinnately divided; peduncles longer than the adjacent petioles. 1. *H. virginianum*

a. Leaves palmately lobed; peduncles shorter than the adjacent petioles. 2. *H. canadense*

1. H. virginianum L. WATER-LEAF.

Woodlands and thickets, in rich alluvial or loamy calcareous soil, especially in and about ravines; common. June 1–20.

Que. to S. Dak., southw. to S. C. and Kans.; rare on the Coastal Plain.

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[29] *P. paniculata* L. and *P. maculata* L. are reported by Dudley as rarely escaping from cultivation.

2. H. canadense L. WATER-LEAF.

In localities similar to the preceding, but in deeper, cooler woods and in soil with *more humus; frequent. June 20–July 10.*

Negundo Woods (*D.*); Six Mile Creek, in Beech Woods and vicinity (*D.*!); woods near Mud Creek Swamp; "woods near Freeville, McLean, Locke Pond, Danby and elsewhere" (*D.*); McLean Bogs; Taughannock Gorge; Salmon Creek; Paine Creek; Howland Island; low woods near Stark Pond.

S. w. Vt. and w. Mass. to Ont. and Ill., southw. to N. C. and Ky.; rare or absent on the Coastal Plain.

108. BORAGINACEAE (BORAGE FAMILY)[80]

a. Flowers regular.
  b. Nutlets armed with barbed prickles.
    c. Nutlets depressed, spreading, covered with prickles. 1. CYNOGLOSSUM
    c. Nutlets erect, barbed on margins or on the back.
      d. Pedicels recurved or reflexed in fruit; nutlets with a ventral keel on the upper half only, attached by a large oblique submedial ovate or deltoid areola; gynobase broader than tall; style shorter than the nutlets; plants biennial or perennial. 2. HACKELIA
      d. Pedicels erect; nutlets narrowly attached all along the well-developed medial ventral keel; gynobase five to ten times taller than broad; style surpassing the nutlets; plants annual. 3. LAPPULA
  b. Nutlets unarmed.
    c. Throat of corolla closed by scales; large coarse plants. 4. SYMPHYTUM
    c. Throat of corolla without scales, sometimes with folds or crests.
      d. Racemes without bracts; corolla salver-form. 5. MYOSOTIS
      d. Racemes bracted; corolla tubular to salver-form.
        e. Corolla large, showy, blue; nutlets attached just above the base. 6. MERTENSIA
        e. Corolla smaller, white or yellow; nutlets attached strictly at the base.
          f. Lobes of corolla spreading, rounded. 7. LITHOSPERMUM
          f. Lobes of corolla erect, acute. 8. ONOSMODIUM
a. Flowers irregular, blue, showy. 9. ECHIUM

1. Cynoglossum (Tourn.) L.

a. Corolla reddish purple; plant stout, leafy to the summit. 1. *C. officinale*
a. Corolla pale blue; plant, and especially the raceme, slender, mostly leafless above. 2. *C. boreale*

1. C. OFFICINALE L. HOUND'S-TONGUE.

Rich gravelly pasture lands and the borders of thickets, in more or less calcareous soils; frequent. June–July.

Common in the McLean region, frequent in gravel about the larger ravines of the basin, and occasional on the richer soils e. of Cayuga Lake; elsewhere rare or absent: Six Mile Creek, near Amphitheater; Fall Creek, e. of Forest Home; Willets; near Paine Creek; Union Springs; Black Creek; Howland Island; and elsewhere.

Que. and Ont. to Man., southw. to S. C., Ala., Kans., and Mont. Naturalized from Eurasia.

2. C. boreale Fernald. (*C. Virginicum* of Cayuga Fl.) WILD COMFREY.

Woodlands, in thin dry sandy and gravelly soils in noncalcareous districts; infrequent. June 10–July 10.

[80] *Anchusa azurea* Mill. (*A. italica* Retz.) is occasionally found near dumps and in waste places. *Asperugo procumbens* L. was found in 1885 near the East Hill schoolhouse (*F. V. Coville*, D.), and *Borago officinalis* L. appeared on the C. U. campus in 1878 and in 1880 (*D.*).

Confined to the chestnut soils of the higher hills s. w., s., and e. of Ithaca: "high hills of Newfield, Danby and Caroline" (*D.*); hilltop n. w. of North Spencer; Thatcher Pinnacles; Dart Woods (*D.*); from Turkey Hill eastw. to Ringwood (*D.*!).

Que. to B. C., southw. to Conn., cent. N. Y., Mich., and Minn.

In Gray's Man., ed. 7, this species is credited to "open woods and alluvial banks."

2. Hackelia Opiz

1. **H. virginiana** (L.) Johnston. (See Contr. Gray Herb., n. s. **68**: 43. 1923. *Lappula virginiana* of Gray's Man., ed. 7. *Echinospermum virginicum* of Cayuga Fl.) BEGGAR'S LICE.

Woodlands and thickets, in rich soil, generally in loam, clay, or alluvium; common. July 10–Aug. 15.

Generally distributed throughout the basin, in the ravines and in rather damp rich woodlands; rare in acid soils, as at Key Hill and in sandy woods on e. shore of Vandemark Pond.

Me. and w. Que. to Minn., southw. to Ga., La., Nebr., and Kans.; infrequent or rare on the Coastal Plain.

3. Lappula (Riv.) Moench

1. **L.** ECHINATA Gilib. (*Echinospermum Lappula* of Cayuga Fl.) STICKSEED.

In slightly calcareous gravels, shales, talus, and cinders; scarce. July.

Along streets, railroad embankments, and the talus of shaly cliffs along the Cayuga Lake shore, most abundant from Lake Ridge to Cayuga: near the Old Armory and on Buffalo St., Ithaca (*D.*); railroad tracks at East Ithaca; near Fall Creek Mills (*D.*); frequent on the sandy points of Cayuga Lake and along the railroad (*D.*!); near Taughannock Falls station.

N. S. to B. C., southw. to N. J. and Kans. Naturalized from Eurasia.

Lappula differs markedly from Hackelia in the details of nutlet attachment.

4. Symphytum (Tourn.) L.

a. Plant rather rough-hairy; leaves decurrent; flowers cream-colored, rarely pink or purplish. 1. *S. officinale*

a. Plant harsh-hispid; leaves not decurrent; flowers usually purple. 2. *S. asperum*

1. **S.** OFFICINALE L. COMMON COMFREY.

Low rich calcareous alluviums; frequent. June 15–Aug. 10.

Inlet Valley to Newfield (*D.*!); near s. w. corner of Cayuga Lake; Six Mile Creek (*D.*); upper Six Mile Creek, Caroline; near Judd Falls; Fall Creek (*D.*); near Ringwood; e. of Freeville (*D.*!); Myers Point, and near Lake Ridge station, abundant (*D.*); and elsewhere.

Newf. to Minn., southw. to Va. and N. C.; rare or absent on the Coastal Plain. Naturalized from Eurasia.

2. **S.** ASPERUM Lep. (See Rhodora **18**: 23. 1916. *S. asperrimum* Donn.) ROUGH COMFREY.

Low gravelly, more or less calcareous, soils along streams and roadsides; rare. June 10–July.

Gravel bars in Salmon Creek, s. of Genoa; roadside near Mud Pond, Conquest; roadside s. of Westbury Bog.

N. S. to N. Y. and Md. Introduced from Eu.

5. **Myosotis** (Rupp.) L.

a. Hairs of the calyx all straight; stems and leaves strigose; perennials.
  b. Corolla 5–8 mm. in diam.; calyx lobes shorter than the tube. 1. *M. scorpioides*
  b. Corolla 2–4 mm. in diam.; calyx lobes as long as the tube or longer. 2. *M. laxa*
a. Hairs of the calyx, at least some of them, hooked; stem and leaves more or less hirsute.
  b. Corolla about 2 mm. in diam.; annuals or biennials.
    c. Pedicels in fruit longer than the calyx; racemes naked at base, and stalked. 3. *M. arvensis*
    c. Pedicels in fruit shorter than the calyx; racemes leafy-bracted at base.
      d. Calyx nearly regular, small, 2–2.5 mm. long. 4. *M. micrantha*
      d. Calyx somewhat 2-lipped, larger, 3–5 mm. long. 5. *M. virginica*
  b. Corolla about 5 mm. in diam.; perennials. [*M. sylvatica*]

1. **M.** SCORPIOIDES L. (*M. palustris* of Cayuga Fl.) FORGET-ME-NOT.

Wet alluvial, rarely marly, meadows and ditches, often in shallow water; frequent. June 15–July 20.

Cut-off from Six Mile Creek, Brookton; abundant on the flats at head of Cayuga Lake; boggy meadow n. e. of Freeville; headwaters of Mud Creek, Freeville; Lake Como; marly moor of Newton Ponds; and elsewhere.

Newf. to N. Y., Ga., and Tenn. Naturalized from Eu.

The forget-me-nots most commonly cultivated are *M. sylvatica* Hoffm. and *M. alpestris* Schm.

2. **M. laxa** Lehm. SMALL-FLOWERED FORGET-ME-NOT.

Wet alluvial and often somewhat boggy meadows and marshes, ditches, and shores, but less distinctly calciphile than the preceding species; common, especially around the larger lakes. July 1–Sept. 1.

Common around Cayuga Lake; rare or absent in the towns s. of Ithaca.

Newf. and Ont., southw. to Ga. and Tenn.; less common on the Coastal Plain.

3. **M.** ARVENSIS (L.) Hill.

Waste places, in gravelly soil; scarce. June.

Dry gravelly fields s. of Ithaca; cemetery, University Ave., Ithaca (*F. L. Kilborne*, D.); lawn near Stone Hall, C. U. campus; Bushy Point, Cayuga Lake (*D.*).

Newf. to Minn., southw. to N. C. Adventive from Eu.

4. **M.** MICRANTHA Pallas. (*M. collina* of Cayuga Fl.)

Cemetery, University Ave., Ithaca (*F. L. Kilborne*, D.), where it "appears each year" (*D.*); not seen in recent years.

Mass. to Ont. and Ohio. Adventive from Eu.

5. **M. virginica** BSP. (*M. verna* of Cayuga Fl.)

Dry scrubby or wooded, stony, thin, noncalcareous soils; occasional. June.

Esty Glen; Renwick slope to Willets (*D.*!); Farley Point (*J. J. Thomas*, D.); "near Taughannock and Trumansburg ravines" (*D.*); s. of Salmon Creek Falls, Ludlowville; Black Brook, Tyre; and elsewhere; especially frequent on the cliff crests along the shore of Cayuga Lake.

Me. and Ont. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

[**M.** SYLVATICA Hoffm. COMMON FORGET-ME-NOT.

Often found around garbage dumps.

Escaped from cultivation. Native of Eu.]

6. **Mertensia** Roth.

1. **M. virginica** (L.) Link. BLUEBELLS. VIRGINIA COWSLIP.

Rich alluvial stream-banks; scarce, but often abundant where it occurs. Apr. 25–May 15.

Near mouth of Enfield Creek (*D.*!); valley s. of Buttermilk Falls (*O. L. Taylor, D.*!); "Neguaena Cr., near the Fleming S. H." (*D.*); Negundo Woods (*D.*!); below Ellis Hollow Swamp (*D.*!); e. of Freeville, by Fall Creek (*Verne Morton*); Taughannock Gorge.

N. Y., Ont., and Minn., southw. to Ga., Ohio, and Kans.; rare or absent on the *Coastal Plain.*

7. **Lithospermum** (Tourn.) L.

a. Nutlets gray, dull, wrinkled, and roughened; corolla destitute of folds or crests in the throat; leaves lanceolate or linear, without apparent lateral veins; annuals or biennials. 1. *L. arvense*

a. Nutlets ivory-white, glossy, smooth; corolla with pubescent crests in the throat; leaves lanceolate to ovate, more veiny; perennials.

b. Corolla plainly exceeding the calyx; leaves lanceolate, acute, firm. 2. *L. officinale*

b. Corolla shorter than or but slightly exceeding the calyx; leaves ovate or ovate-lanceolate, acuminate, thin. 3. *L. latifolium*

1. **L.** ARVENSE L. CORN GROMWELL.

A weed of fields and roadsides, in stony and gravelly soil, probably with some clay; frequent. May–June.

Roadside n. of Enfield Glen; near mouth of Coy Glen; South Hill; C. U. campus; McKinneys; bottom land, Paine Creek.

Que. to Ont. and Mich., southw. to Ga. and Kans.; infrequent in noncalcareous regions. Naturalized from Eu.

2. **L.** OFFICINALE L. COMMON GROMWELL.

Gravelly pasture lands and roadsides, in calcareous regions; scarce. June–July 20.

Confined to the region from Ludlowville to Aurora: bottom land in Paine Creek glen; near Wood Mill station (*D.*).

E. Que. to Minn. and N. J.; rare or absent in noncalcareous regions. Naturalized from Eu.

3. **L. latifolium** Michx.

Rich alluvial gravelly bottom lands; rare. June.

Lower end of Enfield Glen; Fall Creek, on the island at Forest Home (*D.*!) and near the Dryden-Ithaca town line (*F. P. Metcalf & K. M. W.*); Salmon Creek, below Ludlowville (*D.*) and below Genoa.

W. Que. and N. Y. to Minn., southw. to Va., Tenn., Ark., and Kans.; rare or absent in noncalcareous regions.

8. **Onosmodium** Michx.

1. **O. hispidissimum** Mackenzie. (*O. Carolinianum* of Cayuga Fl.) FALSE GROMWELL.

Dry or damp rocky or gravelly soil; rare. July.

"South Hill from near the reservoir to the Quarry Woods beyond the 'Incline'" (*D.*!), that is, around Cayuga St. extension below the railroad; gravel bars in Salmon Creek s. of Genoa (*K. M. W., A. J. E., & L. F. Randolph*).

Cent. N. Y. to Minn. and Nebr. southw. to Ga. and Tex.

9. Echium (Tourn.) L.

1. **E.** VULGARE L. BLUEWEED. BLUE THISTLE. BLUE DEVIL.

A weed in gravelly fields and on gravelly banks; occasional, but probably not thoroughly established. June 20–July 20.

Roadside, Besemer; field w. of Cortland marl ponds; railroad tracks near Mc-Lean.

N. S. to Ont., southw. to N. C. and Nebr.; locally abundant and troublesome. Introduced from Eu.

109. VERBENACEAE (VERVAIN FAMILY)

1. Verbena (Tourn.) L.

a. Leaves ovate to lanceolate, petioled or sessile.
  b. Spikes very slender, interrupted; flowers white. 1. *V. urticaefolia*
  b. Spikes thicker, dense; flowers blue or purple, rarely white.
    c. Plant sparingly rough-pubescent; leaves petioled; corolla 3–4 mm. in. diam. 2. *V. hastata*
    c. Plant velvety-pubescent; leaves sessile; corolla about 10 mm. in diam. 3. *V. stricta*
a. Leaves narrowly lanceolate to linear, sessile; flowers purple. [*V. angustifolia*]

1. **V. urticaefolia** L. WHITE VERVAIN.

Roadsides, fields, and waste places, in rather dry rich soils with little reference to lime content; common. July–Sept. 1.

N. B. to S. Dak., southw. to Fla. and Tex.; less common on the Coastal Plain, and there mostly in cultivated or waste grounds.

A form with pink flowers occurs at Mud Creek, Freeville (*D.*), and along Beaver Brook. Plants which seem to be of hybrid origin are occasionally found (see Dudley, Cayuga Fl.; also, House, Bul. N. Y. State Mus. 254, 1924): Tru-mansburg ravine (*D.*); Taughannock Gorge; Lansing; Freeville (*Peck*).

2. **V. hastata** L. BLUE VERVAIN.

Low grounds, in either sandy, gravelly, or loamy, neutral or subacid, soils, occasionally in damp waste places; common. June 20–Sept. 1.

Generally distributed throughout the basin.

N. S. to B. C., southw. to Fla., Nebr., and Ariz., including the Atlantic Coastal Plain.

This appears to be chiefly var. *paniculata* (Lam.) Farwell (Rept. Mich. Acad. Sci. **2**: 60. 1901).

3. **V.** STRICTA Vent. HOARY VERVAIN.

A weed on sterile gravelly banks; rare. July 20–Aug.

Dry hillside pasture, s. side of lower Buttermilk Glen, 1917 (*A. Gershoy*), apparently established; railroad track near Esty, 1915. Of recent introduction.

Ont. and Ohio to N. Dak. and Wyo., southw. to Tenn., Tex., and N. Mex. Naturalized as a weed farther eastw.

[**V.** ANGUSTIFOLIA Michx.

A plant of this species was found in 1916 along the Lehigh Valley R. R. between Renwick and the Ithaca station (*J. Grossman & F. P. Metcalf*); not seen since.]

110. LABIATAE (MINT FAMILY)

a. Corolla with the upper lip appearing obsolete, the lower lip apparently 5-lobed; nutlets rugose-reticulate. 1. TEUCRIUM

a. Corolla 2-lipped or nearly regular.
b. Stamens long-exserted, approximate, and strongly upcurved; nutlets reticulate. 2. TRICHOSTEMA
b. Stamens not as above; nutlets smooth or granulate.
c. Calyx with a crest or callosity on the upper side. 3. SCUTELLARIA
c. Calyx without a crest or callosity.
d. Stamens and style included in the tube of the corolla; calyx teeth aristate, recurved. 4. MARRUBIUM
d. Stamens and style exserted beyond the corolla tube; calyx teeth not recurved.
e. Corolla strongly 2-lipped; upper lip convex and usually arched as seen from the side (or only slightly so in no. 5), sometimes with revolute margins.
f. Stamens with anthers 4.
g. Upper pair of stamens longer than the lower pair.
h. Anthers not approximate in pairs, plainly exserted, the upper ones declined; calyx nearly regular. 5. AGASTACHE
h. Anthers approximate in pairs, scarcely extending beyond the upper lip.
i. Calyx nearly regular; bracts small. 6. NEPETA
i. Calyx 2-lipped; bracts large, pectinate. [DRACOCEPHALUM]
g. Upper pair of stamens shorter than the lower pair.
h. Calyx closed in fruit; bracts large, broad, and reniform. 7. PRUNELLA
h. Calyx open in fruit; bracts not as above.
i. Calyx inflated in fruit and obscurely nerved; the long tube of the corolla gradually dilated. 8. PHYSOSTEGIA
i. Calyx not inflated, firmer, and strongly nerved; corolla tube abruptly or scarcely dilated.
j. Calyx teeth rigid and spine-tipped.
k. Leaves pinnately crenate; anthers transversely 2-lipped, the smaller lip ciliate. 9. GALEOPSIS
k. Leaves palmately incised or lobed; anthers normal. 10. LEONURUS
j. Calyx teeth not spine-tipped.
k. Nutlets sharply 3-angled, truncate at apex; lower lip of corolla sharply constricted at base. 11. LAMIUM
k. Nutlets obscurely angled, rounded at apex; lower lip of corolla not much constricted; (stamens often deflexed after flowering). 12. STACHYS
f. Stamens with anthers 2.
g. Calyx 2-lipped.
h. Anthers with very much elongated connectives, unequally versatile, one anther cell usually abortive. [SALVIA]
h. Anthers normal. 13. BLEPHILIA
g. Calyx regular. 14. MONARDA
e. Corolla slightly 2-lipped or almost regular; upper lip nearly flat, erect or spreading and not arched.
f. Flowers in more or less crowded clusters or whorls, or axillary.
g. Corolla more or less 2-lipped; upper lip erect or spreading, lower lip also spreading.
h. Fertile stamens 2. 15. HEDEOMA
h. Fertile stamens 4.
i. Stamens curved, often converging under the upper lip of the corolla.

j. Tube of corolla upcurved. 16. MELISSA
j. Tube of corolla straight. 17. SATUREJA
i. Stamens straight, distant, often diverging, never converging.
j. Plant tall, erect; calyx nearly regular. 18. PYCNANTHEMUM
j. Plant low, creeping at base; calyx 2-lipped. 19. THYMUS
g. Corolla nearly regular; all the lobes ascending; stamens diverging.
h. Fertile stamens 2. 20. LYCOPUS
h. Fertile stamens 4. 21. MENTHA
f. Flowers in loose leafless panicles, not more than 2 or 3 at each node; stamens 2. 22. COLLINSONIA

1. **Teucrium** (Tourn.) L.

1. **T. occidentale** Gray. (Including *T. occidentale*, var. *boreale* (Bickn.) Fernald. *T. canadense* of Cayuga Fl.) GERMANDER.

Calcareous, sometimes apparently alluvial, sands and gravels; frequent. July 10–Sept. 1.

Along the shore of Cayuga Lake and about the larger marshes: near Renwick; Taughannock Point; Sheldrake; Kidders; s. of Big Gully Point; Union Springs; Cayuga; and elsewhere.

Me. to B. C., southw. to Pa., Ohio, Mo., N. Mex., and Calif.; rare or absent on the Atlantic Coastal Plain.

2. **Trichostema** L.

1. **T. dichotomum** L. BLUE CURLS.

Dry gravelly or sandy soils, in noncalcareous regions; rare. July–Sept.

High bank n. of Beebe Lake, 1879 (*F. B. Hine*, D.); n. crest of Fall Creek Gorge below Triphammer Falls, 1892–1898; stony field along Fall Creek Drive near the present iron footbridge (formerly the Waite athletic field), 1894 (*K. M. W.*); hill s. w. of West Danby, 1922 (*W. C. Muenscher & W. E. Manning*). Not seen at any of the Fall Creek stations in recent years, as it was exterminated at the first and second stations by the erection of the large bridge, and at the third station by the conversion of land into building lots.

Me. to Mo., southw. to Fla. and Tex.; common on the Coastal Plain.

3. **Scutellaria** L.

a. Flowers small, 5–8 mm. long, in axillary secund racemes. 1. *S. lateriflora*
a. Flowers large, 17–22 mm. long, solitary, axillary. 2. *S. epilobiifolia*

1. **S. lateriflora** L. SKULLCAP.

Marshes, swamps, lake borders, and in wet rock crevices in the ravines, showing no lime preference; frequent. Aug.

Around Spencer Lake and in Dry Run, Spencer; n. of Key Hill; Michigan Hollow; s. of Caroline Depot; Buttermilk Glen; Dwyer Pond; Etna; Fir Tree Swamp, Freeville; Mud Creek, Freeville; McLean Bogs; Paine Creek; and elsewhere.

Newf. to B. C., southw. to Fla., N. Mex., and Ariz.; perhaps less common on the Atlantic Coastal Plain.

2. **S. epilobiifolia** Hamil. (See Rhodora **23**:85. 1921. *S. galericulata* of Gray's Man., ed. 7, and of Cayuga Fl.)

In marshes and along streams, in various soils and showing no lime preference; more common than the preceding species. July–Aug.

Newf. and Alaska, southw. to N. C., Ohio, and Nebr., including the Atlantic Coastal Plain. Found also in Eurasia.

4. **Marrubium** (Tourn.) L.

1. **M.** VULGARE L. HOREHOUND.

Gravelly, probably calcareous, waste soils; rare. July–Aug.

Near Enfield Falls (*Severance* and *Trelease*, D.); "near Ithaca" (*H. B. Lord* D.); abundant in a field s. w. of Paine Creek, also in the ravine (*D.*); drumlin e. side of Westbury Bog.

Me. to Ont., Minn., and B. C., southw. to N. C., Ala., Tex., N. Mex., and Calif. Naturalized from Eu.

5. **Agastache** Clayt.

a. Calyx teeth ovate, obtuse; corolla greenish yellow; stem sharply 4-angled. 1. *A. nepetoides*

a. Calyx teeth lanceolate, acute; corolla purplish; stem obtusely 4-angled. 2. *A. scrophulariaefolia*

1. **A. nepetoides** (L.) Ktze. (*Lophanthus nepetoides* of Cayuga Fl.) GIANT HYSSOP.

Wild banks, in rich gravelly and bottom-land soils; scarce. Aug.

Near mouth of Enfield Glen; base of hill, Larch Meadow; s. side of upper Buttermilk Glen; Negundo Woods (*D.*); South Hill (*D.*); w. side of Inlet Marshes (*D.*!); gravel bar, Salmon Creek s. of Genoa; Paine Creek.

E. Mass., and from Vt. and w. Que. to S. Dak., southw. to Ga., Tenn., Kans., and Ark.; rare or absent on the Coastal Plain. A plant of the Mississippi Basin.

2. **A. scrophulariaefolia** (Willd.) Ktze. (*Lophanthus scrophulariaefolius* of Cayuga Fl.). GIANT HYSSOP.

In situations similar to the preceding; rare. Aug.

Near Percy Field; Pleasant Grove Brook; near s. w. corner of Cayuga Lake (*D.*); Paine Creek (*D.*).

N. H. to Ont. and Wis., southw. to N. C., Ky., and Mo.; rare or absent on the Coastal Plain. Like the preceding species, a plant of the rich lands of the Mississippi Basin.

6. **Nepeta** L.

a. Flowers in terminal and upper-axillary clusters, whitish spotted with purple; plant erect. 1. *N. Cataria*

a. Flowers in axillary clusters, blue; plant creeping and trailing. 2. *N. hederacea*

1. **N.** CATARIA L. CATNIP.

Roadsides and waste places, mostly in rich gravelly soil; common. July–Oct.

Newf. and Que. to Minn. and Oreg., southw. to Ga., Kans., and Utah. Naturalized from Eurasia.

2. **N.** HEDERACEA (L.) Trev. (*N. Glechoma* of Cayuga Fl.) GROUND IVY. GILL-OVER-THE-GROUND. GILL.

Damp rich shaded soil on roadsides, in waste places, and often in ravines; frequent. Apr.–Aug.

Newf. to Ont., Minn., and Oreg., southw. to Ga., Tenn., Kans., and Colo. Naturalized from Eu.

By some authors this species is separated from the genus Nepeta on the basis of the two-lipped or unequally toothed form of the calyx. The calyx, however, is not strongly irregular, and that of other species of Nepeta is often slightly so; therefore the separation does not seem well founded.

[**Dracocephalum** (Tourn.) L.]

[**D.** PARVIFLORUM Nutt. DRAGON HEAD.

Found in 1918 along the lighthouse road near the Ithaca garbage dumps.

E. Que. to the Yukon, southw. to n. and w. N. Y., Mich., Wis., N. Mex., and Ariz.; also adventive farther eastw.]

7. Prunella L.

1. **P. vulgaris** L. (*Brunella vulgaris* of Cayuga Fl.) HEAL-ALL. SELF-HEAL.

Rich loamy, often clayey, soil, in fields, on roadsides, or on the borders of swamps; very common. July–Oct.

Newf. to B. C., southw. to Fla., La., and Ariz., including the Atlantic Coastal Plain. In part naturalized from Eu.

Corollas occasionally white or pink, sometimes very small or very short. Fernald (Rhodora **15**: 179, 1913) has distinguished several varieties and forms, of which the principal one in this region is var. *lanceolata* (Barton) Fernald. After much study of local and other material, this variety is not here retained. The broader and shorter leaves are usually found where the habitat is more open and the growth more stunted. The color of the calyx varies with soil and exposure, as is the case with many plants.

8. Physostegia Benth.

1. **P.** VIRGINIANA (L.) Benth. FALSE DRAGON HEAD.

Rich alluvial soils; rare. Aug. 10–Sept.

Escaped from cultivation: brook in field e. of Roman Catholic cemetery near Ithaca, formerly (*D.*); at the former biological field station near the mouth of Fall Creek; springy pasture one mile s. e. of Dryden; near Lake Como (*G. B. & L. N. Upton*).

Native from Que. to Minn., southw. to Fla., La., and Tex.; rare or absent on the Coastal Plain.

Some authors adopt the name *Dracocephalum* (Tourn.) L. for this genus. Bentham, who first segregated the genus Dracocephalum, placed the present species in Physostegia.

9. Galeopsis L.

1. **G.** TETRAHIT L., var. BIFIDA (Boenn.) Lej. & Court. (See Rhodora **12**: 141. 1910. *G. Tetrahit* of Cayuga Fl.) HEMP NETTLE.

Gravelly waste soil, in calcareous districts; frequent. July 15–Sept.

North Spencer; valley of Dry Run, Spencer; near Slaterville Swamp; Fall Creek, below the mills (*D.*); Dryden Lake; Freeville (*D.*!); Malloryville; McLean; Locke Pond (Lake Como, *D.*); and elsewhere.

Newf. to B. C. and Alaska, southw. to N. C., W. Va., and Mich. Naturalized from Eu.

This variety is the common form from s. N. E., southw. and westw.

10. Leonurus L.

1. **L.** CARDIACA **L.** MOTHERWORT.

Roadsides and waste places, in rich loamy or gravelly soil; common. July–Sept.

N. S. to N. Dak. and Utah, southw. to N. C. and Kans. Naturalized from Eu.

11. Lamium L.

a. Corolla 1–1.5 cm. long, slender.
  b. Upper leaves sessile, clasping. 1. *L. amplexicaule*
  b. Upper leaves petioled. 2. *L. purpureum*
a. Corolla 1.5–2.5 cm. long, much broader and more showy 3. *L. maculatum*

1. **L.** AMPLEXICAULE L. HENBIT.

Rich garden soil or in rich waste places; scarce. Apr.–July, rarely to Sept.

C. U. campus and farm (*D.*!); flats between Railroad Ave. and Fall Creek, formerly (*D.*); near Big Gully (*D.*).

N. B. to Minn. and B. C., southw. to Fla., Ark., and Calif. Naturalized from Eurasia.

2. **L.** PURPUREUM L. RED DEAD NETTLE.

Rich damp banks and gardens; rare. May.

Roadside, hill road n. of Enfield Glen; garden s. of Valley Cemetery s. of Ithaca; *abundant in these locations; herbaceous garden, C. U. campus (C. L. Pratt). First* observed in this flora in 1914.

Newf. to N. C., Pa., and Mo. Naturalized from Eurasia.

3. **L.** MACULATUM L. SPOTTED DEAD NETTLE.

Borders of gardens, roadsides, and waste places; rare. May.

Escaped from gardens: various places in Forest Home (*D.*!); Caroline; Ludlowville.

Me. and Vt. to Va. and Tenn. Native of Eurasia.

A related species, *L. album* L., was found well established by the crossroad west of Ellis Hollow Swamp in 1925.

12. Stachys (Tourn.) L.

a. Flowers yellow or cream color, 15–18 mm. long; plants annual. [*S. annua*]
a. Flowers purplish, 10–13 mm. long; plants perennial.
  b. Stems glabrous on the sides, smooth or bristly on the angles; leaves sharp-toothed, the petioles 7–30 mm. long; rootstock not tuberous.
    c. Angles of the stem glabrous or nearly so; leaves glabrous; calyx teeth spreading. 1. *S. tenuifolia*
    c. Angles of the stem reflexed-bristly; leaves somewhat hairy; calyx teeth often less spreading. 1a. *S. tenuifolia*, var. *aspera*
  b. Stems pubescent on the sides, hirsute on the angles; leaves crenate-serrate, hairy or downy, sessile or the lower ones with short petioles 3–6 mm. long; rootstock constricted-tuberous. 2. *S. palustris*

[**S.** ANNUA L.

Found in a gravelly cultivated field e. of Besemer, 1919 (*K. M. W., A. J. E., & L. F. Randolph*); probably not established. Adventive from Eu.

Mass. to Ga., chiefly on the coast.]

1. **S. tenuifolia** Willd. (*S. aspera*, var. *glabra*, of Cayuga Fl.). HEDGE NETTLE.

Borders of damp alluvial thickets and marshes, or on near-by cinders or gravels; rare. July–Aug.

Cayuga Lake marsh near Ithaca (*D.*); near McKinneys (*D.*); in Herb. J. J. Thomas, from Cayuga Lake (*D.*).

N. Y. to Iowa and Kans., southw. to N. C. and La. A plant of the rich soils of the Mississippi Basin.

A form transitional to var. *aspera* occurs at McKinneys; perhaps such intermediate material was the basis for Dudley's inclusion of the typical form of this species (his var. *glabra*) in the *Cayuga Flora*, as no typical *S. tenuifolia* has been seen in recent years.

1a. **S. tenuifolia** Willd., var. **aspera** (Michx.) Fernald. (*S. aspera* of Cayuga Fl.)

In locations similar to the preceding; frequent. July–Sept.

Abundant on both shores of Cayuga Lake (*D.*!); near Renwick, and at the s. w.

corner of the lake; Willow Point; Portland Point; Union Springs; Canoga; Montezuma Marshes; and elsewhere.

E. Mass. and Vt. to Ont., southw. to Fla. and La.; less frequent on the Coastal Plain.

2. **S. palustris** L. WOUNDWORT.

Gravelly or stony shores or in alluvial swamps; rare. June 25–Aug.

Taughannock Gorge, by the falls; Taughannock Point; shores of Cayuga Lake at Kidders and at Cayuga; sedgy swamp two miles n. of Montezuma village (*K. M. W., A. J. E., & L. F. Randolph*). First found at all these stations in 1919.

Newf. to Mackenzie, southw. to N. C., Ohio, Ill., and Colo.; rare on the Coastal Plain. Found also in Eurasia.

Most of the local specimens have stems with glabrous sides, but in some the sides are hairy. They all have stipitate glands on the calyx. It has not been possible in this region to distinguish var. *homotricha* Fernald.

[**Salvia** (Tourn.) L.]

[**S.** VERTICILLATA L. and other species are found occasionally in waste places and by roadsides, where they have escaped from cultivation but are not established.]

13. **Blephilia** Raf.

1. **B. hirsuta** (Pursh) Benth. WOOD MINT.

Damp woods and thickets, on rich alluvial stream banks and marsh borders; frequent. July.

Near Spencer Lake; below Lucifer Falls, Enfield Glen (*D.*!); at base of hill, Lick Brook; various places in Six Mile Creek ravine; island in Beebe Lake, formerly (*D.*); island, Forest Home; along Fall Creek, between Forest Home and Varna; gravel bars, Salmon Creek n. of Ludlowville; Paine Creek; and elsewhere.

W. Que. and Vt. to Minn., southw. to Ga. and Tex.; rare or absent on the Coastal Plain. A plant of the rich soils of the Mississippi Valley.

14. **Monarda** L.

a. Heads mostly solitary and terminal, rarely in the upper axils; stamens and style exserted beyond the straight upper lip of the unspotted corolla.
  b. Corolla bright red; leaves large, thin, sparingly villous or glabrate. 1. *M. didyma*
  b. Corolla cream color, lavender, or purple.
    c. Leaves large, thin, many-veined, sparingly villous; corolla cream or flesh color, 2–2.5 cm. long. 2. *M. clinopodia*
    c. Leaves smaller, thicker, few-veined, villous or crisp-pubescent, more or less canescent; corolla lavender or purple, 2.5–4 cm. long.
      d. Pubescence crisp-puberulent and villous-hirsute. 3. *M. fistulosa*
      d. Pubescence crisp-puberulent only. 3a. *M. f.*, var. *mollis*
a. Heads axillary or interruptedly spicate; stamens not exceeding the falcate upper lip of the yellowish or lurid, spotted corolla; bracts purple. 4. *M. punctata*

1. **M. didyma** L. OSWEGO TEA. BEE BALM.

Damp woodlands and thickets, chiefly in rich alluvial soils; frequent. July–Aug. 15.

Spencer Lake and Dry Run, Spencer; West Danby to North Spencer (*D.*); Danby (*D.*!); Newfield station; Enfield Glen; Negundo Woods (*D.*!); White Church valley (*D.*); Six Mile Creek; Cascadilla Creek, toward Ellis Hollow (*D.*); Cayuga

Lake marshes (*D.*); Ringwood (*D.!*); Freeville (*D.*); McLean (*D.!*); Taughannock Gorge; Paine Creek; Big Gully; and elsewhere.

W. Que. to Ont. and Mich., southw. to Ga., Ala., and Tenn.; rare or absent on the Coastal Plain.

The flowers vary in color from cerise to almost scarlet.

A form with purple corollas and bracts, and somewhat intermediate between *M. didyma* and *M. fistulosa* in texture, color, and pubescence of the foliage, is *M. fistulosa*, var. *rubra*, of Gray, and is probably a hybrid of the two species mentioned. A study of the material in several large herbaria tends to support this view. In the Cayuga Lake Basin this form has been found: "on the wild bank beyond the Fleming S. H." (*D.!*); by the roadside northw. from the mouth of Enfield Glen; s. crest of upper Buttermilk Glen; lower end of Big Gully (*K. M. W., A. J. E., & L. F. Randolph*).

2. **M. clinopodia** L. BALM.

Damp thickets in ravines; rare. July–Aug.

Six Mile Creek, near Green Tree Falls (*D.!*); base of hill n. of Lick Brook; Trumansburg ravine (*D.*).

Ont. and N. Y. to Ill., southw. to Ga. and Ky. A plant of the western slope of the Allegheny Mts., and of the Ohio Valley.

3. **M. fistulosa** L. WILD BERGAMOT.

Dry gravelly river banks, shores, and hills, the lime preference not known; frequent. July 20–Sept. 10.

Dry hilltop fields, North Spencer; roadside n. e. of mouth of Enfield Glen; Negundo Woods, and up the Inlet Valley to Newfield (*D.*); Renwick (*D.*); region of Mud Creek, Freeville; Myers Point (*D.*); Taughannock (*D.*); Salmon Creek, s. of Genoa; Paine Creek (*D.!*); Utt Point; Union Springs (*D.*).

Me. to Minn. and Colo., southw. to Fla., La., and Tex.; rare on the Coastal Plain.

3a. **M. fistulosa** L., var. **mollis** (L.) Benth. (Var. *mollis*, in part, of Cayuga Fl. *M. mollis* of Gray's Man., ed. 7.)

Of same habitat as the typical form, and often growing with it; more frequent. July 20–Sept. 10.

Roadside thicket n. of mouth of Enfield Glen; Buttermilk Glen; hilltop s. e. of Brookton; s. w. corner of Cayuga Lake; Fall Creek, above Forest Home; near Mud Creek, Freeville; Salmon Creek, s. of Genoa.

Range nearly the same as that of the typical form of the species.

This can scarcely be considered a separate species, as it differs from the typical form of *M. fistulosa* only in the absence of the longer type of hairs in the pubescence.

4. **M. punctata** L. HORSE MINT.

Dry acid sandy fields and roadsides; rare. Aug. 20–Sept. 15.

Abundant along the Phelps-Junius town-line road s. w. of Junius ponds, 1920 (*K. M. W., A. J. E., & L. F. Randolph*), doubtfully native.

N. Y. to Minn., southw. to Fla. and Tex., including the Coastal Plain; adventive also in N. E.

15. **Hedeoma** Pers.

1. **H. pulegioides** (L.) Pers. AMERICAN PENNYROYAL.

Dry sandy or stony soil in exposed places, apparently showing no lime preference; common. Aug.

N. S. and Que. to N. Dak., southw. to Fla., Ala., Ark., and Nebr., including the Coastal Plain.

The European pennyroyal is *Mentha Pulegium* L.

16. Melissa (Tourn.) L.

1. **M.** OFFICINALIS L. BALM.

Rich gravelly, often alluvial, nonacid soils; frequent. July–Aug. 15.

Escaped from gardens: roadside near Newfield, 1878 (*Trelease & Severance*); roadsides near Coy Glen; Tioga St., Ithaca; C. U. campus, near the Veterinary College; old house site, n. side of Fall Creek above Forest Home; small ravine near Elm Beach, Romulus; King Ferry (*D.*); bottom land, Paine Creek; Big Gully (*D.*).

Me. to Fla., Mo., and Ark., also Oreg. and Calif. Naturalized from Eu.

17. Satureja (Tourn.) L.

a. Bracts shorter than the pedicels; annuals.
  b. Calyx naked in the throat; leaves linear. [*S. hortensis*]
  b. Calyx hairy in the throat; leaves ovate to oblong, about 1 cm. long. 1. *S. Acinos*
a. Bracts setaceous, longer than the pedicels and equaling the calyx; leaves ovate, 2–6 cm. long; perennials. 2. *S. vulgaris*

[**S.** HORTENSIS L. SUMMER SAVORY.

Springing up occasionally on dumps and in waste places, but not established. *Escaped from cultivation. Native of Eu.*]

1. **S.** ACINOS (L.) Scheele. (*Calamintha Acinos* of Cayuga Fl.)

Roadsides and waste places; rare. May–Aug.

Along road e. of cemetery, University Ave., Ithaca, 1881 (*H. B. Lord, D.*), also in rocky part of cemetery (*D.*); gravelly strand at lower end of Paine Creek, 1919 (*K. M. W., A. J. E., & L. F. Randolph*).

Ont. to Mass. and N. J. Naturalized from Eu.

2. **S. vulgaris** (L.) Fritsch. (*Calamintha Clinopodium* of Cayuga Fl.) BASIL.

Fields and roadsides, in rich damp alluvial soils, also in rich clays and gravels, less frequent in the more acid sterile soils; common. July.

Newf. to Man., southw. to Mass., Va., and Ind.; much less common on the Coastal Plain. Found also in Eurasia.

There are no good lines of segregation in the genus Satureja. For a discussion of the reasons for retaining the various segregates of this genus in one large genus, see Briquet in Engler and Prantl, Nat. Pflanzenfam., vol. 10, part 3a, p. 296.

18. Pycnanthemum Michx.

a. Leaves narrowly lanceolate or linear; flowers in dense, corymbosely arranged heads; leaves glabrous.
  b. Leaves linear, the larger ones 2–4 mm. wide; stems and branches nearly or quite glabrous; calyx teeth evident on the head, subulate, firm-tipped. 1. *P. flexuosum*
  b. Leaves lanceolate, the larger ones 6–13 mm. wide; stems and branches hairy; calyx teeth obscure, more triangular, scarcely firm-tipped. 2. *P. virginianum*
a. Leaves ovate-oblong; flowers in loose cymose verticels; leaves densely hoary beneath. 3. *P. incanum*

1. **P.** FLEXUOSUM (Walt.) BSP. MOUNTAIN MINT.

Moist, rarely dry, open gravelly sterile fields; scarce. Aug.–Sept.

Low field between Summit Marsh and Spencer Lake; Caroline Pinnacles; South Hill, u. of marsh, 1904, first recorded date (*F. W. Foxworthy* in C. U. Herb.); pastures n. and s. sides of Fall Creek, e. of Forest Home; border of thicket, Triphammer Road near the spring; two miles n. w. of Freeville; n. e. of McLean; near

Townley Swamp. Apparently adventive from farther south. The introduction has taken place since Dudley's *Cayuga Flora* was published.

Cent. Me. to Minn., southw. to Fla., Kans., and Tex.; rare or absent on the Coastal Plain.

2. **P. virginianum** (L.) Dur. & Jack. (*P. lanceolatum* of Cayuga Fl.) MOUNTAIN MINT.

Dry open sandy soils; rare. July 15–Aug. 25.

E. of Slaterville (*W. W. Rowlee, H. H. Whetzel, & K. M. W.*); n. bank of Big Gully; rich woods, Utt Point (*F. P. Metcalf*); sandy acid banks and on the marl moor, Junius marl ponds (*D.!*).

Cent. Me. to N. Dak., southw. to Ga., Ala., and Kans.; infrequent on the Coastal Plain.

3. **P. incanum** (L.) Michx. HOARY MOUNTAIN MINT.

Dry scrubby fields and hillsides, in thin stony, almost noncalcareous, soils, apparently with some clay; often abundant in such localities. July–Aug.

Hillsides, Coy Glen; along the shore of Cayuga Lake from Fall Creek to Aurora (*D.!*).

Mass. and Vt. to Ont., southw. to Fla., Ala., and Mo.; infrequent on the Coastal Plain.

19. Thymus (Tourn.) L.

1. T. SERPYLLUM L. THYME.

Dry sterile gravelly banks by roadsides and in old fields; rare. July–Aug.

"Tobytown Cemetery, Slaterville" (*H. L. Stewart* in C. U. Herb.); C. U. campus, on the Fiske-McGraw (Chi Psi) grounds (*D.* in C. U. Herb.) and behind Caldwell Hall; for many years by the roadside just n. of Pleasant Grove Cemetery; beside the road between West Groton and Locke, 1881 (*F. L. Kilborne*).

N. S. to N. Y. and N. C. Naturalized from Eurasia.

20. Lycopus (Tourn.) L.

a. Calyx teeth deltoid, shorter than the nutlets; leaves not pinnatifid. 1. *L. uniflorus*

a. Calyx teeth subulate, longer than the nutlets; lower leaves pinnatifid. 2. *L. americanus*

1. **L. uniflorus** Michx. (*L. virginicus* of Cayuga Fl.) BUGLE WEED.

In open, grassy or sedgy, boggy or marshy soils, or on shores, apparently in both calcareous and noncalcareous regions; common. July 25–Sept.

Newf. and Lab. to B. C., southw. to Va., Mich., Minn., Nebr., Wyo., and Oreg., including the Atlantic Coastal Plain. Found also in Asia.

In shady localities the leaves become larger and thinner (*L. membranaceus* Bickn.). No material corresponding to *L. virginicus* L. or *L. rubellus* Moench has been found in the Cayuga Lake Basin.

2. **L. americanus** Muhl. (*L. sinuatus* of Cayuga Fl.) WATER HOREHOUND.

In situations similar to the preceding; common. June 25–Aug., rarely Sept.

Newf. to B. C., southw. to Fla., Tex., Utah, and Calif., including the Atlantic Coastal Plain.

21. Mentha (Tourn.) L.

a. Flowers in terminal spikes or clusters.

b. Leaves sessile; spikes slender. 1. *M. spicata*

b. Leaves petioled; clusters ovoid or oblong. 2. *M. piperita*

a. Flowers in dense axillary whorls.
  b. Calyx 1.7 mm. long; corolla 2 mm. long; leaves often blotched with white; stems glabrous or with a few scattered hairs. 3. *M. gentilis*
  b. Calyx 2.5–3 mm. long; corolla 4–5 mm. long; leaves not blotched.
    c. Leaves ovate or ovate-oblong, rounded at base; stems and leaves hairy. 4. *M. arvensis*
    c. Leaves lanceolate or oblong-lanceolate, acute at base.
      d. Stems hairy on the sides; leaves hairy. 4a. *M. arvensis*, var. *canadensis*
      d. Stems glabrous on the sides, minutely hairy on the angles; leaves glabrous or glabrate, averaging slightly broader than in no. 4a. 4b. *M. arvensis*, var. *glabrata*

1. **M.** SPICATA L. (*M. viridis* of Cayuga Fl.) SPEARMINT.

In damp soils of almost any type, but more abundant in calcareous regions; frequent. Aug.–Sept.

Dwyer Pond; on the flats near Fall Creek; McLean Bogs; shores of Cayuga Lake; near Esty Glen; and elsewhere.

N. S. to Ont., Minn., and Wash., southw. to Fla., Tex., and Calif. Naturalized from Eurasia.

The application of the Linnaean name is very involved (see Rhodora **26**:19. 1924). It would seem that Linnáeus intended the name to apply to this plant.

2. **M.** PIPERITA L. PEPPERMINT.

Low gravelly or alluvial stream banks, roadsides, and waste places, mostly in calcareous regions; frequent. Aug.–Sept.

N. S. to Ont. and Minn., southw. to Fla., Tenn., and Ark. Naturalized from Eu.

An inspection of specimens of *M. piperita* from various parts of the world shows this to be a variable species, with leaves narrow or broad, long or short, glabrous or rarely hairy, and with the spikes varying in length and density. Various authors in Europe (for example, Rouy and Foucaud in *Flore de France*, and Ascherson and Graebner in *Fl. Nord. o. Deutsch. Flachl.*) interpret *M. piperita* and *M. citrata* as hybrids between *M. spicata* and *M. aquatica*, and this interpretation seems reasonable. The form taken as typical by Rouy and Foucaud has rather long, lanceolate leaves, and oblong or oblong-linear spikes. This form is infrequent in the wild state in North America, but is the principal peppermint in cultivation. The more common wild form, and the only one in the Cayuga Lake Basin, is intermediate between the form mentioned above as typical and *M. citrata*, having broader and shorter leaves and shorter spikes than the typical form. The plant listed by Dudley (Cayuga Fl.) as *M. piperita*, var. *subhirsuta* Benth., as would appear from a Dudley specimen in the C. U. Herb., has leaves still more like those of *M. citrata* or *M. aquatica*, and the whole plant is villous like *M. aquatica*. The spikes, however, are like those of the local *M. piperita*, though the flowers are intermediate in size between those of *M. piperita* and *M. aquatica* and the corolla is hairy outside as in *M. aquatica*. This form would seem to be another member of the series of hybrids between *M. spicata* and *M. aquatica*, or, in this case, possibly a hybrid between *M. spicata* and *M. arvensis*.

3. **M.** GENTILIS L.

Rich damp gravelly and loamy fields and rich waste places, especially in calcareous districts; rare. Aug.

On the rifle range n. of Fall Creek w. of Ithaca-Dryden town line, 1915 (*L. H. MacDaniels*); near Ringwood, 1917 (*A. R. Bechtel & K. M. W.*).

P. E. I. and n. N. Y. to Iowa, southw. to Ga., N. C., and Tenn. Naturalized from Eu.

4. **M. arvensis** L. WILD MINT.

Wet sandy, gravelly, or mucky places about the borders of swamps and on gravelly shores, without much reference to lime content; scarce. July–Sept.

Larch Meadow; n. side of Six Mile Creek ravine; lake shore, Renwick; McKinneys; Townley Swamp; Salmon Creek; Sheldrake; Big Gully.

Newf. to n. N. Y. and Nebr., southw. to Pa. (?) and Colo. Found also in Eurasia.

Passing insensibly into the following extremes (nos. 4a and 4b).

4a. **M. arvensis** L., var. **canadensis** (L.) Briq.

In situations similar to the preceding; much more common. July–Sept.

Newf. to B. C., southw. to Va. and N. Mex., including the Atlantic Coastal Plain.

4b. **M. arvensis** L., var. **glabrata** (Benth.) Fernald.

In situations similar to the preceding; scarce. July–Sept.

Summit Marsh; woods below Lucifer Falls; Renwick; Dryden Lake; Cortland marl ponds; *Hibiscus Point*; Canoga Marshes.

Newf. to B. C., southw. to n. N. E., n. Pa., Mo., N. Mex., and Calif.; apparently less frequent than the preceding on the Atlantic Coastal Plain.

22. Collinsonia L.

1. **C. canadensis** L. HORSE BALM. RICHWEED.

Damp rich woodlands and on shales in ravines, showing no particular lime preference; uncommon. July–Aug.

Coy Glen; n. shore of Beebe Lake; Forest Home Drive; woods, Mud Creek, Freeville; region of McLean Bogs; Paine Creek; and elsewhere.

W. Que. to Wis., southw. to Fla., Mo., and Kans.; infrequent on the Coastal Plain.

111. SOLANACEAE (NIGHTSHADE FAMILY)[31]

a. Corolla rotate; anthers connivent, opening by terminal pores. 1. SOLANUM

a. Corolla funnel-form or campanulate; anthers not connivent, opening longitudinally.

  b. Calyx inflated, especially in fruit.

    c. Corolla yellow or greenish; calyx 5-cleft; ovary 2-celled. 2. PHYSALIS

    c. Corolla blue; calyx 5-parted; ovary 3–5-celled. [NICANDRA]

  b. Calyx not inflated.

    c. Corolla and stamens somewhat irregular, the corolla strongly reticulate with purple veins; fruit a circumscissile capsule. [HYOSCYAMUS]

    c. Corolla and stamens regular, the corolla not reticulate.

      d. Plant reclining or climbing; corolla small; fruit a berry. 3. LYCIUM

      d. Plant erect; corolla large, 5–15 cm. long; fruit a prickly capsule. 4. DATURA

1. Solanum (Tourn.) L.

a. Corolla 3–8 mm. in diam., white. 1. *S. nigrum*

a. Corolla 15–25 mm. in diam.

  b. Plant prickly, erect; corolla about 25 mm. in diam.

    c. Berry *not inclosed by the calyx*; leaves coarsely and rather acutely lobed; flowers lavender or white. 2. *S. carolinense*

[31] *Lycopersicon esculentum* Mill. (tomato) and *Solanum tuberosum* L. (potato) spring up occasionally on garbage dumps and along the shore of Cayuga Lake, but are not established.

c. Berry inclosed by the spiny calyx; leaves bluntly lobed or 1-2-pinnatifid; flowers yellow. [*S. rostratum*]
b. Plant not prickly, reclining or climbing; corolla about 15 mm. in diam., violet or white. *3. S. Dulcamara*

1. **S. nigrum** L. COMMON NIGHTSHADE.

Waste gravelly or stony and loamy, usually shaded, soils; occasional. July–Sept.
Cascadilla Creek (*D.*); Fall Creek Gorge (*D.*!); elsewhere about Ithaca (*D.*!); Cayuga Lake shore (*D.*); woods around Cortland marl ponds; Paine Creek; Crane Creek; and elsewhere.
N. S. to Alberta, southw. to Fla. and Tex., including the Coastal Plain; nearly cosmopolitan.

2. **S. CAROLINENSE** L. HORSE NETTLE.

Gravelly fields and waste places, in rich soils; occasional. July–Aug.
W. of Spencer Lake; cornfields and hayfields near Enfield Glen; s. side of Coy Glen; near Percy Field; near the second bridge, Forest Home; golf links, abundant; along state road w. of Glenwood. A plant of recent introduction from farther south and west.
N. Y. to Ill. and Nebr., southw. to Fla. and Tex.; also adventive northeastw. to N. E. and Ont.

[**S. ROSTRATUM** Dunal. BUFFALO BUR.

Found occasionally in waste places about dwellings, but not established; native of the Great Plains.]

3. **S. DULCAMARA** L. BLUE NIGHTSHADE. EUROPEAN BITTERSWEET.

Low ground, in a great variety of soils; common. June–Aug.
N. S. to Minn. and Wash., southw. to Pa., Ga., and Kans. Naturalized from Eurasia.
White-flowered plants are found occasionally.

[**S. PSEUDO-CAPSICUM** L. JERUSALEM CHERRY.

Dump, lighthouse road, Ithaca, 1925 (*W. C. Muenscher*). A common greenhouse and window plant.]

2. Physalis L.

a. Plants glandular-pubescent; berry yellow.
b. Plants annual, hoary; corolla 5–10 mm. in diam.; fruiting calyx about 2 cm. long, the lobes 3–4.5 mm. long. *1. P. pruinosa*
b. Plants perennial; corolla 15–22 mm. in diam.; fruiting calyx 2.5–3 cm. long, the lobes 5–10 mm. long.
c. Foliage and stems puberulent; anthers yellow. *2. P. heterophylla*
c. Foliage and stems more villous-hirsute; anthers violet. *2a. P. h., var. ambigua*
a. Plants glabrous, or strigulose above, not glandular; berry purple.
b. Plants annual; roots fibrous; flowering calyx 5–6 mm. long, the teeth barely acute. [*P. ixocarpa*]
b. Plants perennial from rootstocks; flowering calyx about 9 mm. long, the teeth more or less acuminate. *3. P. subglabrata*

1. **P. pruinosa** L. STRAWBERRY TOMATO.

Sandy soil and waste places; rare. July–Sept.
Ithaca flats and along the lighthouse road, 1921 (*A. J. E., S. H. Burnham, & C. L. Wilson*); Cayuga Heights, 1921. Doubtfully native.
Mass. to Ont., southw. to Fla., Iowa, and Colo., probably including the Coastal Plain.

2. **P. heterophylla** Nees. GROUND CHERRY.

Gravelly soil; rare. June–Sept.
Shore of Spencer Lake, 1917; Cornell Heights, 1902.
N. B. to Sask., southw. to Fla., Colo., and Tex., including the Coastal Plain.

2a. **P. heterophylla** Nees, var. **ambigua** (Gray) Rydb. (*P. virginiana* of Cayuga Fl., at least in part.) GROUND CHERRY.

Dry fields and roadsides, in sandy or gravelly noncalcareous loams; occasional. June–Sept.
Railroad, near Lick Brook; hillside between Coy Glen and Enfield Glen; Fall Creek (D.); Red Mills; Taughannock Gorge; about Junius ponds and bogs; n. w. of Butler.
N. H. and R. I. to Wis., southw. to Ga., La., and Ark., including the Coastal Plain.

[**P.** IXOCARPA Brot. GROUND CHERRY. STRAWBERRY TOMATO.

Waste soil; springing up occasionally, but not established.
City dump, lighthouse road, Ithaca, 1923 (*S. H. Burnham*).
Escaped from cultivation. Native of Mexico.]

3. **P. subglabrata** Mackenzie & Bush. (*P. virginiana* of Cayuga Fl., in part, probably. *P. philadelphica* Lam.?) GROUND CHERRY.

Rich, chiefly moist, gravelly soil, rarely in stony clays; occasional. July–Sept.
N. and s. of Coy Glen; flats near the Ithaca fair grounds; Cayuga Heights; s. e. of Esty Glen; Taughannock Point; field near Benson Corners; Paine Creek; along Clyde River, Galen; and elsewhere.
Ont. and R. I. to Minn., southw. to Ga., Ky., and Colo.; infrequent on the Coastal Plain.

[**Nicandra** Adans.]

[**N.** PHYSALODES (L.) Pers. APPLE OF PERU.

A weed of waste rich soil; rare. Aug.–Sept.
Cayuga Heights, 1925; South Butler, 1921 (*Mrs. George Fanning*); doubtfully established.
N. S. to Ont., southw. to Fla., Tenn., and Mo. Introduced from Peru.
Nicandra is in the list of *nomina conservanda* of the International Code.]

[**Hyoscyamus** (Tourn.) L.]

[**H.** NIGER L. BLACK HENBANE.

Filled-in soil, e. of Drill Hall, C. U. campus, 1917 (*A. R. Bechtel*); not established.
E. Que. and N. S., to Ont. and Mich. Native of Eu.]

3. **Lycium** L.

1. **L.** HALIMIFOLIUM Mill. (*L. vulgare* of Cayuga Fl.) MATRIMONY VINE.

Gravelly soils, in pastures and waste places; occasional. June–Sept.
South crest of Cascadilla Glen; field between Railroad Ave. and Fall Creek, e. of Cayuga St., Ithaca, formerly (*D.*!); near Freeville (*D.*); pasture on Hibiscus Point near Union Springs.*
Ont. to Va., Minn., and Kans. Introduced from Eu.

4. Datura L.

1. **D.** STRAMONIUM L. JIMSON WEED. THORN APPLE. STRAMONIUM.

Rich gravelly soil in waste places; scarce. Aug.–Sept.

Between Railroad Ave. and Fall Creek, Ithaca, formerly; shore of Cayuga Lake (*D.*); Highland Ave., Cayuga Heights.

N. S. to Minn., southw. to Fla. and Tex. Naturalized from tropical regions.

Both white- and purple-flowered individuals occur. The purple ones have been separated as var. *chalibea* Koch (*D. Tatula* L., see Rouy and Foucaud, Fl. France **10**: 371, 1908). Variations in the length and the number of prickles on the capsule have been noted by students of genetics, but these variations are not correlated with the color of the flowers. It seems unwise to attempt the recognition taxonomically of the variability of these characters.

112. SCROPHULARIACEAE (FIGWORT FAMILY)

ARTIFICIAL KEY TO THE GENERA

a. Corolla personate.
  b. Corolla spurred at base; calyx normal, not angled. 2. LINARIA
  b. Corolla spurless at base; calyx enlarged and angled. 6. MIMULUS
a. Corolla not personate.
  b. Fertile stamens 5; corolla rotate, nearly regular. 1. VERBASCUM
  b. Fertile stamens 2; corolla often rotate (see also 3d *b*).
    c. Corolla rotate, salver-form, or tubular; stamens much exposed or exserted, sterile ones wanting. 9. VERONICA
    c. Corolla tubular or bilabiate; fertile stamens not exserted beyond the upper lip.
      d. Sterile filaments slender, slightly exserted, 2-lobed. 7. ILYSANTHES
      d. Sterile filaments short or wanting, included, simple. 8. GRATIOLA
  b. Fertile stamens 4; corolla never rotate.
    c. Corolla scarcely 2-lipped, the limb but slightly irregular.
      d. Sterile fifth stamen well developed; upper 2 lobes of corolla covering the lower 3 lobes in the bud. 4. PENSTEMON
      d. Sterile stamen wanting; lower 3 lobes of corolla covering the upper 2 lobes in the bud.
        e. Flowers yellow; anther sacs parallel, awned at base; capsule acute or acuminate. 10. AUREOLARIA
        e. Flowers pink or purple; anther sacs more or less divergent, obtuse to mucronate at base; capsule rounded and mucronate at apex. 11. AGALINIS
    c. Corolla manifestly 2-lipped.
      d. Lips very unequal, the upper one narrow, elongated, about four times the length of the lower one; bracts often colored and lobed. 12. CASTILLEJA
      d. Lips more nearly equal; bracts not colored, rarely lobed.
        e. Upper lip 4-lobed, lower lip entire; flowers in a naked panicle. 3. SCROPHULARIA
        e. Upper lip 2-lobed, lower lip 3-lobed; flowers racemose or spicate on the stem and branches.
          f. Flowers large, color white or pinkish; limb of corolla dorsoventrally flattened; leaves sharply serrate. 5. CHELONE
          f. Flowers smaller, color purple, brownish, or yellowish; limb of corolla not dorsoventrally flattened.
            g. Leaves pinnately lobed and crenate; bracts not spiny-toothed. 13. PEDICULARIS
            g. Leaves entire; bracts distinctly spiny-toothed. 14. MELAMPYRUM

1. **Verbascum** (Tourn.) L.

a. Plant densely tomentose; flowers nearly sessile, in a dense spike. 1. *V. Thapsus*
a. Plant not tomentose; flowers slender-pedicelled, in an open raceme. 2. *V. Blattaria*

1. **V.** THAPSUS L. COMMON MULLEIN.

Dry gravelly and sandy fields, mostly in the less strongly acid or the neutral soils; common. July–Sept.

In the Cayuga Lake Basin, most abundant in the gravels at McLean, in the delta gravels near Cayuga Lake, and on the stony lake and ravine slopes.

N. S. to S. Dak. and Calif., southw. to Fla. and Kans. Naturalized from Eurasia.

2. **V.** BLATTARIA L. MOTH MULLEIN.

Dry gravelly, more or less calcareous, fields and waste places, rarely in clay; frequent. June–Aug.

Que. to Oreg. and Calif., southw. to Fla. Naturalized from Eurasia.

Two color forms occur, the flowers being either yellow or white. Usually one color predominates in each locality. Hybrids of these color forms, as demonstrated by Dr. E. W. Lindstrom, are sterile, which raises the question whether or not these forms are genetically and specifically distinct.

2. **Linaria** (Tourn.) Mill.

a. Plant erect.
  b. Flowers large, 20–40 mm. long, yellow; plant glabrous. 1. *L. vulgaris*
  b. Flowers small, 5–9 mm. long, purplish white; plant glandular. 2. *L. minor*
a. Plant prostrate or trailing.
  b. Leaves hastate. 3. *L. Elatine*
  b. Leaves orbicular-reniform, coarsely few-lobed. 4. *L. Cymbalaria*

1. **L.** VULGARIS Hill. BUTTER-AND-EGGS. YELLOW TOADFLAX.

Gravelly and clayey banks and fields; fairly common except in light acid soils. June–Oct.

Newf. to Oreg., southw. to Ga. and N. Mex. Naturalized from Eurasia.

2. **L.** MINOR (L.) Desf.

Cinders and ballast along railroad tracks; rare. June–July.

Railroad yards at East Ithaca (*L. F. Randolph*); McLean station; cinders along railroad near Atwaters (*L. F. Randolph, A. J. E., & K. M. W.*) and at Union Springs. First found in 1918, at East Ithaca.

Atlantic coast to Ont. and Mich., mostly northw. Adventive from Eu.

3. **L.** ELATINE (L.) Mill.

Gravelly calcareous shores and gardens; scarce. June–Sept.

"Shore of Cayuga L." (*Gray* in Torrey's Fl. N. Y.); Taughannock Point; Farley Point, in several places (*D.*!), a bad weed in gardens; Sheldrake Point (*H. B. Lord*); Hibiscus Point.

Mass. to Mo., southw. to Ga. Naturalized from Eurasia.

4. **L.** CYMBALARIA (L.) Mill. KENILWORTH IVY.

Escaped from cultivation but persisting for several years: moist cliffs along Fall Creek, Forest Home, 1915 (*L. H. MacDaniels*); around the greenhouses of Sage College and of the Agricultural College; Cayuga Heights.

Native of Eu.

[**Collinsia** Nutt.]

[**C. verna** Nutt. BLUE-EYED MARY.

"Ithaca, *Aikin*" (Torrey, Fl. N. Y.). Not found since, and probably an error.]

3. **Scrophularia** (Tourn.) L.

a. Sterile stamen purple; leaves slender-petioled, rounded or cordate at base, serrate; panicle broad, branches loosely flowered; stem with grooved sides, glabrous; in flower July 15–Sept. 1. 1. *S. marilandica*

a. Sterile stamen greenish yellow; leaves with shorter and stouter petioles, more truncate at base, incised-serrate; panicle narrower, branches more densely flowered; stem with flat sides, usually puberulent; in flower June 10–July 20. 2. *S. lanceolata*

1. **S. marilandica** L. (*S. nodosa* of Cayuga Fl., in part.) FIGWORT.

Moist thickets and banks, on rich gravelly or alluvial bottom lands; frequent. July 15–Sept. 1.

Bank of Inlet at Negundo Woods; in gravel, upper Coy Glen; e. side of Percy Field; at several stations near Renwick; Fall Creek, at Forest Home and toward Varna; gravel bars and alluvial woods in Salmon Creek below Genoa; Taughannock Gorge; Paine Creek; Big Gully; low field near Canoga Marshes; along Clyde River, Galen; and elsewhere.

Me. to S. Dak., southw. to N. C., Ga., Tenn., Kans., and La.; infrequent or rare on the Coastal Plain.

2. **S. lanceolata** Pursh. (See Torreya **22**: 81. 1922. *S. leporella* of Gray's Man., ed. 7. *S. nodosa* of Cayuga Fl., in part.)

Thickets and open fields, usually in drier upland, more or less sterile, situations; more frequent. June 10–July 20.

Gravelly roadside n. w. of Cayuta Lake; dry field, top of South Pinnacle, Caroline; n. e. of Caroline; pasture near Besemer; dry pasture s. of Buttermilk Falls; n. of Fall Creek, above Forest Home; roadside, Etna; low fields, Mill Creek, Dryden; dry knolls, Malloryville; border of dry woods, s. of Cayuga Heights; roadside n. of East Lansing; Lake Ridge; Duck Lake; and elsewhere.

N. B. and Que. to Minn., southw. to N. C. and Mo.; perhaps more frequent than the preceding species on the Coastal Plain.

The stems of this species are more often purple than in *S. marilandica*, the flowers are often larger, the corolla is more lustrous, and the lobes of the upper lip are more oblong. The capsule also is usually more conical and firmer-walled. These differences are, however, not constant.

4. **Penstemon**[32] (Mitch.) Schmidel

a. Stem villous or puberulent; corolla but slightly expanded upward, distinctly 2-lipped, the throat partly closed. 1. *P. hirsutus*

a. Stem glabrous below the inflorescence; corolla expanded upward, nearly regular, the throat open. 2. *P. laevigatus*, var. *Digitalis*

1. **P. hirsutus** (L.) Willd. (*P. pubescens* of Cayuga Fl.) BEARD-TONGUE.

Dry rocky and stony fields and ledges, occasionally in gravel, in more or less calcareous soils; abundant in places. May 20–July 10.

[32] Generally spelled *Pentstemon*. For the spelling here adopted, see Pennell, Contr. U. S. Nat. Herb. 20 : 325. 1920.

In the Cayuga Lake Basin, mostly confined to the vicinity of the Cayuga Lake valley; frequent about the ravines from Enfield northw., and abundant along the lake shore.

Cent. Me. to Wis. and Man., southw. to Fla. and Mo.; infrequent or rare on the Coastal Plain.

2. **P.** LAEVIGATUS Ait., var. DIGITALIS (Sweet) Gray. BEARD-TONGUE.

Moist gravelly, mostly noncalcareous, fields; frequent. June–July.

West Danby; South Hill; upper Cascadilla Creek; Ringwood; near Freeville Bog; near Mud Creek, Freeville; McLean; near Esty Glen; s. end of Wyckoff Swamp; along Central N. Y. Southern R. R., in Lansing; Butler; Cato; and elsewhere. Introduced in recent years from farther southwestw.

Pa. to Iowa, southw. to Fla., Mo., and Ark. Naturalized northeastw.

5. Chelone (Tourn.) L.

1. **C. glabra** L. TURTLEHEAD.

Wet places in rich soils of various kinds, in both calcareous and noncalcareous regions; frequent, and generally distributed. July 20–Sept.

Newf. to Man., southw. to Fla., Ala., and Kans., including the Coastal Plain.

6. Mimulus L.

1. **M. ringens** L. MONKEY FLOWER.

Wet places in rich soils of various kinds, in both calcareous and noncalcareous regions; frequent. July–Aug.

N. B. to Man., southw. to Ga., Tenn., Tex., and Nebr., including the Coastal Plain.

7. Ilysanthes Raf.

1. **I. dubia** (L.) Barnh. (*I. gratioloides* of Cayuga Fl.) FALSE PIMPERNEL.

Rich alluvial and calcareous gravelly or sandy muddy shores and swales; scarce. July–Aug.

Spencer Lake; Six Mile Creek; marshes at head of Cayuga Lake (*D.*!); mouth of Salmon Creek (*D.*!); near railroad e. of Judd Falls (*D.*); Cortland marl ponds (*D.*!); Ledyard.

N. B. to Wis. and S. Dak., southw. to Fla., Ark., and Tex.; infrequent or rare on the Coastal Plain.

8. Gratiola L.

1. **G. neglecta** Torr. (See Rhodora 20: 65. 1918. *G. virginiana* of Cayuga Fl.)

Muddy places on shores and in fields or ditches, mostly in heavy soils; frequent. June–Oct.

Spencer Lake; on hills s. e. of Brookton; Six Mile Creek; Ellis Hollow; near Etna; Dryden Lake; McLean Bogs; Chicago Bog; Taughannock Point; near Asbury; Spring Lake; Junius; and elsewhere.

Cent. Me. to B. C., southw. to Fla., Tex., and Calif.; much less frequent on the Atlantic Coastal Plain.

9. Veronica (Tourn.) L.

a. Tube of corolla much shorter than the calyx; capsule flat, usually emarginate.
  b. Racemes or spikes axillary; perennials.
    c. Leaves glabrous; veins indistinct.
      d. Leaves short-peticled, ovate or ovate-oblong, not cordate.
        1. *V. americana*

d. Leaves sessile, often clasping.
e. Racemes rather close, straight; fruiting pedicels 3–5 mm. long; leaves entire, or obscurely crenate-serrate.
f. Capsule orbicular or short-oblong, scarcely retuse; upper leaves elliptic-oval or obovate; racemes glabrous. 2. *V. Anagallis-aquatica,* var. *latifolia*
f. Capsule broader than long, slightly emarginate; upper leaves linear-lanceolate or oblong-lanceolate, broad-based; racemes glandular-pubescent. 2a. *V. A.*, var. *glandulosa*
e. Racemes loose, very slender, zigzag; fruiting pedicels 10–15 mm. long; leaves linear, remotely denticulate. 3. *V. scutellata*
c. Leaves hairy, more or less rugose. 4. *V. officinalis*
b. Racemes or spikes terminal, or flowers axillary and solitary; annuals or perennials.
c. Flowers in a terminal spike or raceme, only the lower flowers in the axils of normal foliage leaves.
d. Leaves rather thick, inconspicuously veiny, entire or shallowly toothed, glabrous.
e. Plant perennial from a creeping matted base; leaves ovate-oval; capsule broader than long; corolla pale, exceeding the calyx. 5. *V. serpyllifolia*
e. Plant annual, erect; leaves oblong; capsule orbicular; corolla pale, shorter than the calyx.
f. Stems glabrous or practically so. 6. *V. peregrina*
f. Stems glandular-puberulent. 6a. *V. p.*, var *xalapensis*
d. Leaves thin, rugose, coarsely toothed, hairy; corolla small, blue; annuals. 7. *V. arvensis*
c. Flowers all in the axils of normal foliage leaves, the latter broadly ovate, rugose, coarsely toothed, hairy; annuals.
d. Corolla scarcely exceeding the calyx; capsule orbicular, slightly notched. 8. *V. agrestis*
d. Corolla much exceeding the calyx; capsule broadly obcordate or reniform, broadly notched. 9. *V. Tournefortii*
a. Tube of corolla equaling or exceeding the calyx; capsule oblong-ovate, acute, not compressed; tall perennials, with whorled leaves. 10. *V. virginica*

1. **V. americana** Schwein. AMERICAN BROOKLIME.

Ditches, brooks, and other wet places, on clays or gravels in more or less calcareous districts; common. June–July.

Generally distributed throughout the basin, except in the more acid soils of the higher hills.

Newf. to Alaska, southw. to N. C., Pa., the Great Lakes, Nebr., N. Mex., and Calif.; rare or absent on the Atlantic Coastal Plain.

2. **V. Anagallis-aquatica** L., var. **latifolia** (Britton) Farwell. (See Papers Mich. Acad. Sci. **2**: 40. 1923. *V. Anagallis,* in part, of Cayuga Fl.)

In ditches and pools, in calcareous regions; scarce. Aug.

Base of hill n. of Lick Brook; end of lower switchback, D., L. & W. R. R., South Hill; backwater below Beech Woods, Six Mile Creek (*C. C. Thomas & A. J. E.*); Eddy Pond, Cascadilla Glen, 1882 (*D.*); marsh w. of Inlet.

Conn. to N. Y., southw. to N. J. and Pa.; absent on the Coastal Plain.

The first varietal name is var. *latifolia* Britton.

2a. **V. Anagallis-aquatica** L., var. **glandulosa** Farwell. (See Rept. Mich. Acad. Sci. **19**: 249. 1917. Rhodora **23**: 37. 1921. *V. Anagallis*, in part, of Cayuga Fl.)

Ditches and slow streams; rare.

Cortland marl ponds (*D.*); "abundant in outlet of Lay's Iron Spring, west of Black Lake" (*D.*); *ditch near Black Lake* (*L. F. Randolph, A. J. E., & K. M. W.*).

Mass., Vt., and Ont., southw. to Pa., Ill., Okla., and Tex.; absent on the Coastal Plain.

A study of material of *V. Anagallis-aquatica* from various parts of Europe and North America seems to indicate that it is a polymorphous species with many varieties *interrelated in such a way that no good specific lines can be drawn between* them.

3. **V. scutellata** L. MARSH SPEEDWELL.

Wet places in marshes and about bogs, generally in slightly calcareous soils; infrequent. June–Oct.

Between Spencer and North Spencer; n. e. of Hanshaw Corners; Slaterville Swamp; Ringwood; Freeville Bog; Chicago Bog; s. corner of Wyckoff Swamp; *Montezuma; and elsewhere.*

Lab. and Newf. to B. C., southw. to N. Y., Minn., and Calif.; infrequent on the Atlantic Coastal Plain. Found also in Eurasia.

4. **V. officinalis** L. COMMON SPEEDWELL.

Dry gravelly and stony banks, in old fields, pastures, and open woodlands, mostly in subacid soils; frequent. June–July.

Border of Summit Marsh; Dry Run, Spencer; West Hill, abundant (*D.*); Beech Woods, Six *Mile Creek; Cayuga Heights; Turkey Hill, abundant* (*D.*); *Ringwood;* McLean (*D.!*); and elsewhere.

Newf. to Ont. and S. Dak., southw. to Ga. and Tenn., including the Coastal Plain. Found also in Eurasia.

5. **V. serpyllifolia** L. THYME-LEAVED SPEEDWELL.

Slightly moist, mostly run-out, grasslands and lawns; common, and generally distributed. May–Oct.

Newf. to Ont., southw. to Ga., N. Mex., and Calif., *including the* Atlantic *Coastal* Plain. Found also in Eurasia.

6. **V. peregrina** L.

Cultivated grounds and waste places, in sandy or gravelly soils; common. May–June.

N. B. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

6a. **V. peregrina** L., var. **xalapensis** (HBK.) Pennell. (See Torreya **19**: 167. 1919.)

In situations similar to the preceding; rare.

In the planted white birch thicket, Fox Ridge, 1922.

N. E., also Mississippi Valley, westw. and southwestw.; rare in the Allegheny region.

7. **V.** ARVENSIS L. CORN SPEEDWELL.

Dry gravelly or rocky fields, waste places, and light sterile, often acid, cultivated grounds; common. May–June.

Newf. to B. C., southw. to Fla., Kans., and Tex. Naturalized from Eurasia.

8. **V.** AGRESTIS L. FIELD SPEEDWELL.

A weed in gardens, lawns, and by roadsides, mostly in sandy, gravelly, or stony places; rare. Apr.–May 10.

Garden between Forest Home and Pleasant Grove Cemetery, formerly (*H. S. Jackson* in C. U. Herb.); roadside and lawn, lower end of Cook St., Ithaca.
Newf. and the Maritime Provinces of Canada; and from N. Y. and N. J. to La., chiefly near the coast. Naturalized from Eurasia.

9. **V. Tourneforti** C. C. Gmel. (*V. Buxbaumii* of Cayuga Fl. *V. persica* Poir.?)
Rich soils of various types; scarce. Mar.–Apr.
"W. Hill in Sanford's garden, (*Prof. J. H. Comstock*, 1882)!" (*D.*); garden near Coy Glen; Cascadilla Glen, above Eddy Pond and near the C. U. baseball cage; Upland Road, Cayuga Heights; hotel site, Taughannock Falls.
Newf. to Ont., N. Y., and Ohio; also Colo. to Calif. Naturalized from Eurasia.

10. **V. virginica** L. (*Leptandra virginica* Nutt.) CULVER'S ROOT.
Dry rich sandy sheltered banks; rare. July 15–Aug.
"Wild bank beyond the Fleming S. H." (*D.*); "near Fall Cr, north of Ithaca, (*Dr. Underwood, of Groton.*)" (*D.*); Utt Point (*D.*!); woods near end of Farley Point (*D.*); Junius, *Sartwell* (*D.*).
N. S. (?), w. Mass., and Conn., to B. C., southw. to Ala. and Tex.; rare or absent on the Atlantic Coastal Plain.
Other sections of the genus connect this species, often segregated as Leptandra, with the more typical species of Veronica (see Engler and Prantl, Nat. Pflanzenfam.); therefore it seems best not to maintain the genus Leptandra here.

10. Aureolaria Raf.[33]

a. Corolla pubescent on the outside; plant glandular-viscid. — 1. *A. pedicularia*, var. *intercedens*
a. Corolla glabrous on the outside; plant not glandular.
  b. Stem puberulent; pedicels very short. — 2. *A. virginica*
  b. Stems glabrous and glaucous; pedicels as long as the calyx. — 3. *A. flava*

1. **A. pedicularia** (L.) Raf., var. **intercedens** Pennell. (See Torreya 19:207. 1919. *Gerardia pedicularia* of Gray's Man., ed. 7, and of Cayuga Fl.) FALSE FOXGLOVE.
Dry sandy, gravelly, or stony, noncalcareous woodlands; frequent. Aug.–Sept.
On the hills w., s., and e. of Ithaca, along the shores of Cayuga Lake, and in the sandy regions n. of the lake: Ball Hill, Danby (*D.*); Thatcher Pinnacles (*D.*); White Church (*D.*); Cascadilla woods; Fall Creek; Glenwood Road; and elsewhere. Absent in the McLean region and on the clays and richer soils back from the lake shores.
N. Y. to Mo., southw. to N. C.; this variety infrequent on the Coastal Plain.

2. **A. virginica** (L.) Pennell. (*Gerardia flava* of Gray's Man., ed. 7, and of Cayuga Fl.)
In habitats similar to the preceding; frequent. July–Aug.
Distribution similar to the preceding: Coy Glen; South Hill; Beebe Lake; w. shore of Cayuga Lake; and elsewhere.
S. Me. to Ont. and Wis., southw. to Fla., Miss., and Iowa, including the Coastal Plain.

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[33] The contending views as to the status of the generic and specific names in the old genus Gerardia are ably discussed by Blake (see Rhodora 20:66, 1918) and by Pennell (see Torreya 19:205, 1919; also, Rhodora 20:133, 1918). Aureolaria and Agalinis are scarcely distinct generically, as the morphological characters on which they are based seem very trivial. Until the matter can be settled through a more thorough study of these and related genera, it seems wise to treat them as distinct, especially since not all the combinations have been made that would be necessary under a united genus.

3. **A. flava** (L.) Farwell. (*Gerardia virginica* of Gray's Man., ed. 7. *G. quercifolia* of Cayuga Fl.)

In situations similar to the preceding; less frequent. July–Aug.

S. Me. to Minn., southw. to Fla., Ala., and Ill.; rare on the Coastal Plain.

Pennell's view is here adopted, that the name *Gerardia flava* L. should be applied to the glaucous-stemmed species. That Linnaeus based his name on specimens rather than on references is supported by the fact that he appended a description of his own.

11. **Agalinis** Raf.

a. Pedicels short, not more than twice the length of the calyx; capsules 5–6 mm. long. 1. *A. paupercula*

a. Pedicels long, two to six times the length of the calyx; capsules about 4 mm. long. 2. *A. tenuifolia*

1. **A. paupercula** (Gray) Britton. (*Gerardia paupercula* of Gray's Man., ed. 7. *G. purpurea* of Cayuga Fl.)

In damp sandy soil; rare. Aug.–Sept.

"Farley's Point, rather abundant along the south shore" (*D.*), not seen since; marsh about Newton Ponds (*D.!*); springy place n. of Spring Lake (*F. P. Metcalf & A. H. Wright*).

N. S. to Man., southw. to Ala. and Tenn., including the northern Coastal Plain.

In addition to the sand, the presence of some salts in the soil, as lime or sodium chlorid, may be an influencing factor in the localization of this species in the Cayuga Lake Basin.

2. **A. tenuifolia** (Vahl) Raf. (*Gerardia tenuifolia* of Gray's Man., ed. 7, and of Cayuga Fl.)

Dry sandy banks, in more acid and less saline regions than the preceding; rare. Aug.–Sept.

N. bank of Salmon Creek, below Ludlowville (*D.*); sandy bank, e. side of Phillips Pond, 1922.

W. Me. and w. Que. to Nebr., southw. to Fla. and Tex.; frequent along the coast.

These two species and the three species of *Aureolaria* are partly parasitic on the roots of various plants.

12. **Castilleja** Mutis

1. **C. coccinea** Spreng. PAINTED CUP.

Low sandy, often somewhat acid, soils; rare. May–July.

"Near Aurora," 1842 (*Dr. Alex. Thompson*); bank near Phillips Pond, a few, 1887 (*Mrs. S. A. Little* in C. U. Herb.); roadside, Junius to Oaks Corners (*Mrs. Burtin* in C. U. Herb.).

Me. (?) and Mass. to Man., southw. to Ga., Tenn., Kans., and Tex.; rare or absent on the Coastal Plain.

13. **Pedicularis** (Tourn.) L.

a. Leaves pinnately parted; capsule lanceolate, three times the length of the calyx; plant decumbent at base, 1.5–4 dm. high. 1. *P. canadensis*

a. Leaves pinnately lobed; capsule ovate, scarcely longer than the calyx; plant erect, 3–9 dm. high. 2. *P. lanceolata*

1. **P. canadensis** L. LOUSEWORT. WOOD BETONY.

Dry woodlands, in gravelly and stony, slightly acid, soils; frequent. May.

Frequent on the "acid" soils of the hills w., s., and e. of Ithaca, along the shore of Cayuga Lake, and in the sandy country n. of the lake; rare in the McLean region and in the clays and richer soils back from the lake shore.

N. S., cent. Me., and w. Que., to Man., southw. to Fla., Miss., Kans., Colo., and northern Mex., including the Atlantic Coastal Plain.

This species occurs in two color forms, pale yellow and purple, but without other points of difference.

2. **P. lanceolata** Michx.

Open springy places, in gravelly soils; rare. Aug. 20–Sept. 20.

Springy places on hill s. side of Coy Glen; e. of the clock factory, Ithaca (*D.*); springy place along Fall Creek w. of Dryden-Ithaca town line; small marsh w. of Pleasant Grove Cemetery (*D.*); near railroad n. of Salmon Creek (*D.*).

Mass. to Ont. and Man., southw. to N. C., Ohio, and Nebr., including the Coastal Plain.

In the Cayuga Lake Basin this species occurs always in calcareous or even marly soil.

14. Melampyrum (Tourn.) L.

1. **M. lineare** Lam. (*M. americanum* of Cayuga Fl.) COW WHEAT.

Dry woodlands, in sandy or gravelly noncalcareous soils; common. June–July.

Abundant on the hills w., s., and e. of Ithaca, along the shores of Cayuga Lake, and in the sandy districts n. of the lake; rare or absent in the McLean region and in the clays and richer soils back from the lake shores.

Newf. to B. C., southw. to Ga., Tenn., and Iowa; common on the Atlantic Coastal Plain.

113. OROBANCHACEAE (BROOM RAPE FAMILY)

a. Lower flowers fertile, cleistogamous, with minute corollas; upper flowers sterile, with long tubular curved corollas; plant branched above. 1. EPIFAGUS

a. Lower and upper flowers alike; plant unbranched above the base.

  b. Calyx spathe-like, deeply cleft in front; plant thick, cone-like; flowers subsessile; stamens slightly exserted. 2. CONOPHOLIS

  b. Calyx regularly 4–5-cleft; plant not cone-like; flowers long-peduncled; stamens included. 3. OROBANCHE

1. Epifagus Nutt.

1. **E. virginiana** (L.) Bart. BEECHDROPS.

Gravelly soils in beech woods, where it is parasitic on the roots of beech; frequent. Sept.–Oct.

In scattered stations where beech occurs: common in the beech woods of Six Mile Creek and in the beech forests of the McLean district.

N. B. and Ont. to Wis., southw. to Fla., Miss., and La.; infrequent or rare on the Coastal Plain.

2. Conopholis Wallr.

1. **C. americana** (L. f.) Wallr. CANCER-ROOT. SQUAWROOT.

Dry or damp woodlands of oak and chestnut, mostly in sandy, gravelly, or stony, noncalcareous soils; apparently parasitic on the roots of oak and chestnut; scarce. June–July.

On the hills w., s., and e. of Ithaca, and on the clays and richer soils back from the lake where oak occurs: border of Summit Marsh; upper Coy Glen; s. w. corner of Cayuga Lake; Fall Creek, e. of Forest Home; n. e. of Hanshaw Corners; Turkey Hill; Ringwood. Absent in the McLean region.

S. Me. to Mich., southw. to Fla. and Tenn.; rare on the Coastal Plain.

3. **Orobanche** (Tourn.) L.

1. **O. uniflora** L. (*Aphyllon uniflorum* of Cayuga Fl.) CANCER-ROOT.

In low or upland woods, in sandy, gravelly, or stony soils apparently with little regard to lime content; parasitic on various herbs, including ferns; scarce. May 20–June.

Coy Glen; Beebe Lake (*D*[1]); Cascadilla woods (*D*.); Turkey Hill (*D*.); Fir Tree Swamp, Freeville; low woods near Mud Pond, McLean Bogs; Duck Lake; absent on the clay soils and rich alluviums of the basin.

Newf. *to Ont. and possibly* B. C., *southw. to* Ga., Tex., *and* Calif.; *occasional on* the Atlantic Coastal Plain.

This species is frequently separated from other species of Orobanche *as a distinct* genus, but in Orobanche there are all gradations and combinations of the characters employed in such separation.

114. LENTIBULARIACEAE (BLADDERWORT FAMILY)

a. Lips of the calyx 2–3-cleft; upper lip of corolla recurved-spreading, the palate inconspicuous; leaves entire, in a basal rosette. 1. PINGUICULA

a. Lips of the calyx entire or nearly so; upper lip of corolla erect, the palate usually very conspicuous; leaves dissected, scattered. 2. UTRICULARIA

1. **Pinguicula** (Tourn.) L.

1. **P. vulgaris** L. BUTTERWORT.

Dripping limy, mostly shaded, cliffs in ravines; rare. June 10–30.

Cascadilla Creek, both sides of Glen Pond, 1869 (*Dr. Jordan!*), and farther down the ravine (*D*.); Fall Creek, on Primrose Cliff below Triphammer Falls (*D.!*) and opposite Rocky Falls (*D*.); Taughannock Gorge, s. side in several places (*D.!*). Apparently the only other stations reported in N. Y. State are: along the Genesee River, below the falls at Rochester, below Portage Falls, and near Mount Morris; Sidney (Hoy *fide* Clute, Fl. Susq.).

N. B. and Que. to N. Y., Mich., Mont., B. C., and far northw. Found also in Eurasia. A very rare plant in the southern part of its range.

2. **Utricularia** L.

a. Stems slender, creeping or floating; leaves forked or divided, scattered, bladder-bearing; flowers large or small; spur mostly blunt.

b. Leaves 20–50 mm. long, pinnate; flowers 10–20 mm. wide; plants floating in stagnant pools. 1. *U. vulgaris*, var. *americana*

b. Leaves less than 20 mm. long, forking; flowers various.

c. Branches strongly dimorphous, the bladders on almost leafless branches, the leaves on bladderless branches; leaves sessile, several times forked, the divisions broad and flat; bladders 2.5–4 mm. long; corolla 10–20 mm. in diam., the lips very unequal in length. 2. *U. intermedia*

c. Branches all similar, equally bladder-bearing; divisions of the leaves more capillary; bladders 1–1.8 mm. long; corolla 4–8 mm. in diam.

d. Corolla open in the throat, the upper lip much shorter than the lower lip; spur almost obsolete; pedicels recurved in fruit; plants, in this region, mostly free-floating and rarely flowering; bladders 1.5–1.8 mm. long. 3. *U. minor*

d. Corolla closed by a palate, the lips nearly equal in length; spur about half the length of the lip; pedicels erect in fruit; plants creeping on mud in very shallow water, the leaves very much reduced; bladders 1–1.5 mm. long. 4. *U. gibba*

a. Stems, exclusive of the long erect peduncle, very short, submerged in the mud; some leaves capillary, divided, root-like, and bladder-bearing, others subulate, undivided, green, and grass-like; flowers large and showy; spur long and sharp.
5. *U. cornuta*

1. **U. vulgaris** L., var. **americana** Gray. (*U. vulgaris* of Cayuga Fl. *U. macrorhiza* Le Conte.) GREAT BLADDERWORT.

Floating in the stagnant waters of pools and bayous, in neutral or acid waters containing much organic matter; frequent. July 15–Aug.

Various places in the Inlet Marshes (*D.*!); Myers Point; pools between railroad and cliffs n. of Ludlowville, and n. of King Ferry (*D.*!); Taughannock Point; marsh n. of Union Springs (*D.*!); Black Lake and Cayuga Marshes (*D.*); Junius peat bogs; swale s. of Conquest.

Lab. to Minn. and Alaska, southw. to Md., Okla., Ariz., Lower Calif., and Mex., including the Atlantic Coastal Plain. Found also in Eurasia.

2. **U. intermedia** Hayne.

Creeping in shallow water among sedges, in more or less calcareous places; scarce. July–Aug. 10.

Summit Marsh (*D.*); Dryden Lake (*D.*!); Black Lake (*D.*); Junius marl ponds; sedgy meadows, Westbury Bog.

Newf. to B. C., southw. to N. J., Ind., Iowa, and Calif., including the Atlantic Coastal Plain. Found also in Eu.

3. **U. minor** L.

Floating in stagnant water among reeds and sedges, mostly in calcareous situations; rare. "May–July" (Gray's Man., ed. 7).

Summit Marsh (*D.*!); Black Lake (*D.*); in a sedgy meadow, Westbury Bog.

Newf. to B. C., southw. to Conn., w. N. Y., the Great Lakes, Utah, and Calif., in both acid and alkaline waters.

In the Cayuga Lake Basin, *U. minor* is not confined to shallow water, as is sometimes stated, being often found floating where the water is deep. It has not yet been found here in flower. A form with coarser foliage, but not referable to any other species, occurs at Lowery and Newton Ponds.

4. **U. gibba** L.

Creeping in open, very shallow, water, on sedgy marl flats; rare. Aug.–Sept. 10.

E. side of Lowery Ponds, 1916 (*F. P. Metcalf & K. M. W.*), abundant in 1922.

Me. and N. S. to Fla., Ala., and Tex., near the coast; and from w. Vt. to Mich. and Ill.

5. **U. cornuta** Michx.

Peat bogs, in muddy openings in the sphagnum; rare. July 15–Aug.

Junius peat bogs (*Sartwell*, D.!).

Newf. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

115. ACANTHACEAE (ACANTHUS FAMILY)

1. Dianthera (Gronov.) L.

1. **D. americana** L. WATER WILLOW.

Lake shores, and borders of the larger marshes in waters containing traces of lime or salt; scarce. July–Aug.

Confined to the Ontario plain: Farley Point (*D.*!) and vicinity; Cayuga to Montezuma, along the river (*D.*!); salt region n. e. of Montezuma village; Duck Lake.

W. Ont. and Vt. to Wis., southw. to Ga. and Tex.; rare or absent on the Coastal Plain.

116. PHRYMACEAE (LOPSEED FAMILY)

1. Phryma L.

1. **P. Leptostachya** L. LOPSEED.

Rich banks in woods and thickets; frequent. July.

In the alluvial soils in the ravines of the basin, and in the clays and richer soils back from Cayuga Lake; rare or absent on the more acid soils of the hills s. of Ithaca, and apparently absent in the McLean district: Coy Glen; Fall Creek; woods n. e. of Hanshaw Corners; Paine Creek; and elsewhere.

N. B. and Que. to Man., southw. to Fla. and Kans.; infrequent on the Coastal Plain. Found also in e. Asia.

117. PLANTAGINACEAE (PLANTAIN FAMILY)

1. Plantago (Tourn.) L.

a. Leaves basal; plant scapose.
- *b*. Leaves broad, abruptly contracted into long petioles; spikes long and slender; seeds plump, not hollowed on the inner face.
  - *c*. Blade pinnately veined. — 1. *P. cordata*
  - *c*. Blade palmately veined.
    - *d*. Capsule ovate, circumscissile near the middle; sepals and bracts broad and rounded obtuse; base of petiole greenish white, rarely purplish. — 2. *P. major*
    - *d*. Capsule elliptic-oblong, circumscissile much below the middle; sepals and bracts narrow, strongly carinate, subacute; base of petiole purple. — 3. *P. Rugelii*
- *b*. Leaves from ovate to oblong or linear, tapering to a short petiole or a sessile base; spikes short.
  - *c*. Leaf blade ovate, oblong, or elliptical; seeds flat or nearly so on the inner face. — 4. *P. media*
  - *c*. Leaf blade lanceolate or linear; seeds plainly concave on the inner face.
    - *d*. Blade lanceolate; bracts shorter than the flowers. — 5. *P. lanceolata*
    - *d*. Blade linear; bracts longer than the flowers. — 6. *P. aristata*

a. Leaves cauline, either opposite or whorled. — [*P. arenaria*]

1. **P. cordata** Lam.

Alluvial soil along streams in wooded swamps; rare.

"In herb. of Professor Thomas, collected in Ledyard, 1827" (*D.*); not seen since.

N. Y. and Ont. to Minn., southw. to Ala., La., and Mo.; rare or absent e. of the Allegheny Mts.

2. **P. major** L. PLANTAIN.

Roadsides, fields, lawns, and waste places, also in brackish marshes and on gravelly shores; very common. June–Sept.

Cosmopolitan or nearly so.

Variable as to size and pubescence. On the brackish marshes and on shores the plants are smaller and more pubescent.

3. **P. Rugelii** Dcne. PLANTAIN.

Rich roadsides, fields, and waste places; very common. June–Sept.

N. B. to N. Dak., southw. to Fla. and Tex., including the Coastal Plain.

Usually brighter green and thinner-leaved than the preceding species, and almost always glabrous.

4. **P.** MEDIA L. HOARY PLANTAIN.

Gravelly lawns and fields; rare.

Grounds of President White Place, 1883 (*F. L. Kilborne, D.*); lawn, Barton Place and Thurston Ave., Cornell Heights, 1913 (*G. F. Atkinson* in C. U. Herb.).

Me. to Ont., southw. to R. I. and N. Y. Adventive from Eurasia.

5. **P.** LANCEOLATA L. RIB-GRASS. ENGLISH PLANTAIN.

Roadsides, fields, and waste places; very common. June–Aug.

Newf. to B. C., southw. to Fla. and Kans. Naturalized from Eurasia.

Occasional plants, as on Hibiscus Point, have shorter and blunter spikes (var. *sphaerostachya* Mert. & Koch, see Rhodora **24**: 204. 1922).

6. **P.** ARISTATA Michx.

Dry gravelly or sandy sterile roadsides and fields; rare. June–July.

Foot of Thatcher Pinnacles, 1905 (*K. M. W. & E. M. Cipperly*); South Hill, near the marsh; Thurston Ave., formerly (1904, *E. M. Cipperly* in C. U. Herb.); knoll s. w. of Mud Pond, McLean Bogs, 1914 (*G. E. Douglas & C. C. Thomas*). Of recent introduction from the West.

Ill. to B. C., southw. to La. and N. Mex.; widely introduced in e. U. S.

[**P.** ARENARIA Waldst. & Kit. WHORLED PLANTAIN. SANDWORT.

Edge of dump, lighthouse road, Ithaca, 1925, several plants (*W. C. Muenscher*). Adventive from Eu.]

118. RUBIACEAE (MADDER FAMILY)

a. Leaves verticillate; fruit dry, of 2 twin carpels; herbs.
  b. Corolla rotate; sepals obsolete; flowers not involucrate. 1. GALIUM
  b. Corolla funnel-form; sepals lanceolate; flower cluster with a gamophyllous involucre. 2. SHERARDIA
a. Leaves opposite or sometimes in whorls of 3; fruit not as above.
  b. Plants trailing, with evergreen leaves; fruit a berry produced from the fused ovaries of the two terminal flowers. 3. MITCHELLA
  b. Plants shrubby, erect, with deciduous leaves; fruit dry, splitting into indehiscent parts; flowers in heads. 4. CEPHALANTHUS
  b. Plants herbaceous, erect; fruit a many-seeded capsule; flowers in cymes. 5. HOUSTONIA

1. Galium L.

a. Ovary and fruit uncinate-hispid (obscurely so in no. 4).
  b. Leaves 3-nerved (obscurely so in no. 3), not cuspidate.
    c. Flowers sessile, or nearly so, along the primary branches of the inflorescence, purple or greenish yellow.
      d. Leaves lanceolate; corolla deep purple, 3–5 mm. in diam. 1. *G. lanceolatum*
      d. Leaves oval; corolla greenish yellow, 2–2.5 mm. in diam. 2. *G. circaezans*
    c. Flowers panicled, pedicelled.
      d. Corolla greenish purple; leaves oval, pilose. 3. *G. pilosum*
      d. Corolla pure white; leaves narrowly lanceolate, glabrous. 4. *G. boreale*
  b. Leaves 1-nerved, cuspidate.
    c. Leaves about 8 in each whorl, oblanceolate; annuals. 5. *G. Aparine*
    c. Leaves 6 in each whorl, elliptical; perennials. 6. *G. triflorum*

a. Ovary and fruit glabrous.
b. Flowers yellow. 7. *G. verum*
b. Flowers white.
c. Leaves cuspidate.
d. Leaves in 6's on the main stem, in 4's or 5's on the branches, elliptical; plant very rough. 8. *G. asprellum*
d. Leaves in 8's on the main stem, in 6's on the branches, narrowly oblanceolate; plant slightly rough. 9. *G. Mollugo*
c. Leaves blunt.
d. Flowers paniculate; endosperm lunate in cross section. 10. *G. palustre*
d. Flowers solitary or in 2's or 3's; endosperm annular in cross section.
e. Corolla 4-lobed, the lobes acute.
f. Leaves ascending, 1.5–2.5 cm. long; inflorescence mostly terminal; fruit 2.5–3.5 mm. broad. 11. *G. tinctorium*
f. Leaves mostly reflexed, 0.5–1.5 cm. long; inflorescence finally strongly lateral; fruit 1–1.5 mm. broad. 12. *G. labradoricum*
e. Corolla 3-lobed, rarely 4-lobed, the lobes obtuse; fruit 1.5 mm. broad.
f. Pedicels straight, glabrous. 13. *G. Claytoni*
f. Pedicels slender, arcuate, scabrous. 14. *G. trifidum*

1. **G. lanceolatum** Torr. WILD LIQUORICE.

Dry woodlands, in sandy, gravelly, or stony, mostly neutral, soils; frequent. June–July.

Mostly on the hills w. and s. of Ithaca, and near the ravines; rare in the McLean district, in the clays and richer soils, and in the more acid sands: West Danby; Newfield Glen; Enfield Glen; Coy Glen; near South Hill Marsh; Beebe Lake; Renwick slope; region of McLean Bogs; and elsewhere.

S. Me. and w. Que. to Minn., southw. to Va., Ky., and Ohio; rare or absent on the Coastal Plain.

2. **G. circaezans** Michx. WILD LIQUORICE.

In locations similar to the preceding, but in more acid soils; frequent. June 20–July.

Coy Glen; Beebe Lake; McGowan Woods; Turkey Hill; n. e. of Hanshaw Corners; woods near Mud Creek Swamp; around Junius peat bogs; and elsewhere.

S. Me. and w. Que. to Minn., southw. to Fla. and Tex., including the Coastal Plain.

3. **G. pilosum** Ait.

Dry sandy woodlands, in acid soils; rare. July.

Wild bank in rear of Valley Cemetery, s. of Ithaca (*D.!*); s. crest of Coy Glen; *around Junius marl ponds (D.!).*

N. H. to Ont., Mich., Ill., and Kans., southw. to Fla. and Tex.; common on the Coastal Plain.

4. **G. boreale** L. NORTHERN BEDSTRAW.

Dry open places, mostly in soil derived from sandstone and shales mixed with clay, rarely over more calcareous shales; common. June–July.

Common on the South Hill terraces and along the lake shores; rare or absent on the higher hills and in the McLean region.

Que. to Alaska, southw. to N. J., Pa., Mich., Mo., N. Mex., and Calif.; rare or absent in granitic N. E. and on the Atlantic Coastal Plain. Found also in Eurasia.

5. **G. Aparine** L. CLEAVERS. GOOSE GRASS.

Borders of woods and thickets, in moist rich sandy or alluvial soils; common. May.

In the Cayuga Lake Basin, mostly confined to the vicinity of Cayuga Lake and the Inlet Valley.

N. B. to Ont. and S. Dak., southw. to Fla. and Tex., including the Coastal Plain. Probably in part introduced from Eurasia.

6. **G. triflorum** Michx. SWEET-SCENTED BEDSTRAW.

Dry woodlands, in rich calcareous or slightly acid soils; frequent. July.

Generally distributed throughout the basin, except perhaps in the chestnut and oak forests of the higher hills.

Greenland and Newf. to B. C. and Alaska, southw. to Fla., La., Colo., and Calif.; less common on the Atlantic Coastal Plain. Found also in Eu.

7. **G. VERUM** L. YELLOW BEDSTRAW.

Moist, or rarely dry, rather rich gravelly or sandy fields and banks, in nearly neutral soils; rare. June–July.

Grassy bank, Highland Ave., Cayuga Heights, 1914 (*M. C. Wiegand*); Six Mile Creek, field s. of main reservoir, 1917 (*A. Gershoy*); bank of Mill Pond, Ellis Hollow, 1915 (*A. J. E. & F. P. Metcalf*). Of recent introduction.

Me. to Ont., southw. to N. J. and Pa. Adventive from Eurasia.

8. **G. asprellum** Michx. ROUGH BEDSTRAW.

Borders of swamps and along streams, in rich alluvial soils; common. July–Oct.

Newf. to Minn., southw. to N. C., Ill., Mo., and Nebr.; occasional on the Coastal Plain.

9. **G. MOLLUGO** L.

Cultivated fields, in sandy or gravelly loam; rare. June–July.

Near Lick Brook, 1922; waste ground, Ithaca flats, 1921 (*S. H. Burnham & C. L. Wilson*); field e. of C. U. barns, 1916 (*F. P. Metcalf*); pasture along railroad e. of Judd Falls, 1916 (*A. Gershoy*); along state road, e. of McLean Bogs, 1925.

Newf. to Vt. and Ohio, southw. to Va. and Pa. Naturalized from Eu.

10. **G. PALUSTRE** L. (See Bul. Torr. Bot. Club **24**: 389. 1897.)

Meadows, ditches, and borders of marshes, mostly in rich alluvial soil; frequent. June–July.

West Hill, Ithaca; Ithaca flats toward Renwick; Beebe Lake; "Fall Creek," 1875 (*D.* in C. U. Herb.); Fall Creek, above Forest Home; Etna; n. e. of Freeville; Dryden Lake; Taughannock Creek, above Mecklenburg; Shurger Glen; near Asbury; near Mud Pond, Ira. Probably of recent introduction, the only collection known before 1894 being that of Dudley cited above.

Newf. and Que. to Mich., southw. to Conn. and N. Y., apparently less common along the coast. In at least a part of its range appearing as though introduced. Found also in Eurasia.

11. **G. tinctorium** L. (*G. trifidum*, var. *latifolium*, of Cayuga Fl.)

Open or shaded marshes and in alluvial woods, in rich and perhaps slightly saline soils; frequent. July.

Near the shores of Cayuga Lake, and on the Ontario plain n. of the lake: s. w. corner of Cayuga Lake; Inlet Marshes (*D.*); West Hill; near Esty Glen; near King Ferry (*D.*); Myers Point; Long Point; Farley Point and vicinity; Montezuma; Savannah and Conquest, common.

N. S. to Mich. and Nebr., southw. to N. C. and Ariz., including the Coastal Plain. In shady places the leaves are broader.

12. **G. labradoricum** Wiegand.

Calcareous bogs; rare. May 25–July 10.

Moor of Mud Pond, McLean Bogs; Spring Lake (*F. P. Metcalf & K M. W.*);

Westbury Bog (*F. P. M. & K M. W.*); arbor vitae swamp e. of Clyde (*F. P. M. & K. M. W.*).

Lab. to Wis., southw. to n. Conn. and N. Y.

13. **G. Claytoni** Michx. (Including *G. C.*, var. *subbiflorum* Wiegand, as to eastern specimens. *G. trifidum* of Cayuga Fl.)

Borders of bogs, marshes, ditches, and shores, in somewhat acid or neutral soils; fairly common. July–Aug.

Spencer Lake; w. of Key Hill; s. of Caroline Depot; Inlet Marshes; Six Mile Creek; near Woodwardia Bog; Freeville Bog; McLean Bogs; Chicago Bog; near Townley Swamp; Junius bogs; Slayton Pond; Mud Pond, Conquest; and elsewhere.

Newf. and N. Y. to Mich. and Nebr., southw. to Fla., Mo., and Tex., including the Coastal Plain.

14. **G. trifidum** L. (*G. trifidum*, var. *pusillum*, of Cayuga Fl.)

Borders of bogs and boggy shores of lakes, often on fallen logs, in calcareous regions; scarce. July 15–Aug.

Shore of Spencer Lake and in exsiccated places toward Summit Marsh; Taughannock Point; Dryden Lake; Mud Pond, McLean Bogs; Red Mills; Junius marl ponds.

Newf. and Lab. to B. C., southw. to n. and w. N. E., cent. N. Y., Ohio, Mich., and Colo.; rare or absent in granitic N. E. and on the Atlantic Coastal Plain. Found also in Eurasia.

In 1920 an exsiccated swale near the maple grove north of Spencer Lake was found to be carpeted with a Galium which resembled in every respect material at hand of *G. brevipes* Fernald and Wiegand (see Rhodora 12:78. 1910). The sporadic occurrence of this plant so far from its nearest known station in eastern Maine suggests that this may be only a form of some species growing in this locality. In previous years, when the swale was less dry, *G. trifidum* was found there, and a frequent tendency for the short pedicels to curve near the tip suggests that the plant in question may represent an ecological or a pathological condition of *G. trifidum*.

2. Sherardia (Dill.) L.

1. **S.** ARVENSIS L. FIELD MADDER.

A weed in lawns; rare. June–July.

C. U. campus, near w. end of Morse Hall, 1914 (*C. C. Thomas*), and in front of Roberts Hall, 1915–1920 (*A. J. E.*).

N. S. to Ont., southw. to N. J. and Ohio. Adventive from Eu.

3. Mitchella L.

1. **M. repens** L. PARTRIDGE BERRY.

Dry, rather sterile, gravelly or sandy woods of various types, without apparent reference to the lime content of the soil; common. June 25–July 25.

Generally distributed throughout the basin, except in the richer soils and clays. Plants with leafy berries: Cascadilla Creek, 1880 (*H. B. Lord*) and 1881 (*D.*), and near Brookton, 1881 (*D.*). Plants with white berries (forma *leucocarpa* Bissell, see Rhodora 13:32. 1911): woods, McLean Bogs, 1883 (*O. E. Pearce*, D.!).

N. S. to Ont. and Minn., southw. to Fla., Ark., and Tex., including the Coastal Plain.

4. Cephalanthus L.

1. **C. occidentalis** L. BUTTONBUSH.

In shallow water of swamps and marshes, more rarely about bogs; frequent. July 10–Aug. 15.

Outlet of Cayuta Lake; West Danby; White Church; marshes near Renwick and the lighthouse (*D.*!); Taughannock Point; along the e. shore of Cayuga Lake; Phillips Pond; and elsewhere.

S. w. N. B. and N. S. to w. Ont. and Wis., southw. to Fla., Tex., Ariz., and Calif.; common on the Atlantic Coastal Plain.

5. Houstonia L.

a. Flowers long-pedicelled; corolla salver-form. 1. *H. caerulea*
a. Flowers short-pedicelled, distinctly cymose; corolla funnel-form. [*H. lanceolata*]

1. **H. caerulea** L. BLUETS.

Sandy or gravelly and stony, poorly drained, acid soils, often with some clay; local. Apr. 20–June, and often in Oct.

On hill n. w. of North Spencer station; low fields of the Inlet Valley s. of West Danby; around South Hill Marsh (*D.*!), extending from Buttermilk Falls to the n. crest of the hill.

N. S. to Ont. and Wis., southw. to Ga., Ala., and Mo.; common on the Coastal Plain.

[**H. lanceolata** (Poir.) Britton.

"*H. purpurea*, L., var. *longifolia*, Gray, appeared on the Fiske-McGraw grounds, 1884" (*D.*). A specimen so labeled by Dudley in the C. U. Herbarium is *H. lanceolata*. It has not since been seen in this locality.]

119. CAPRIFOLIACEAE (HONEYSUCKLE FAMILY)

a. Corolla tubular or campanulate, sometimes 2-lipped; style slender; flowers not in terminal compound cymes, variously colored.
  b. Plant shrubby, erect, or, if trailing, without long peduncles.
    c. Leaves serrate; fruit a capsule. 1. DIERVILLA
    c. Leaves entire or with a few coarse teeth; fruit a berry.
      d. Corolla irregular, long- or short-funnel-form; berry 2–3-celled, several-seeded. 2. LONICERA
      d. Corolla regular, short-funnel-form or campanulate; berry 4-celled, 2-seeded. 3. SYMPHORICARPOS
  b. Plant semiherbaceous, trailing; fruit nearly or quite dry; flowers 2, or rarely 4, on a long peduncle (see also 3d *b*). 4. LINNAEA
  b. Plant herbaceous, erect; fruit fleshy; flowers axillary, sessile. 5. TRIOSTEUM
a. Corolla rotate or nearly so, regular; stigmas almost or quite sessile; flowers in terminal compound cymes, white; fruit fleshy.
  b. Leaves simple; fruit 1-seeded. 6. VIBURNUM
  b. Leaves pinnate; fruit 3–5-seeded. 7. SAMBUCUS

1. Diervilla (Tourn.) Mill.

1. **D. Lonicera** Mill. (*D. trifida* of Cayuga Fl.) BUSH HONEYSUCKLE.

Dry gravelly, stony, or rocky thickets and ravine banks, in acid or nearly neutral soils; frequent. June.

Spencer Lake; Six Mile Creek; Cascadilla Creek; Fall Creek; Ringwood; Malloryville; McLean; and elsewhere.

Newf. to Man., southw. to s. N. E. and Wis., and in the mts. to Ga.

2. Lonicera L.[34]

a. Flowers on 2-flowered axillary peduncles; sepals deciduous; leaves not connate.
  b. Habit upright.
    c. *Corolla scarcely bilabiate, the divisions nearly equal.*
      d. Leaves glabrous; corolla white or rose, its lobes nearly equaling the tube. 1. *L. tatarica*
      d. Leaves ciliate; corolla straw color, the lobes much shorter than the tube. 2. *L. canadensis*
    c. *Corolla strongly bilabiate, the upper lip 4-lobed, the lower one unlobed.*
      d. Leaves oval, downy; peduncles 8–14 mm. long. 3. *L. Xylosteum*
      d. Leaves oblong, glabrous or glabrate in age; peduncles 15–40 mm. long. 4. *L. oblongifolia*
  b. Habit trailing or twining; foliage hairy. 5. *L. japonica*
a. Flowers sessile, verticillate, in heads or interrupted spikes; sepals persistent; upper leaves near the flower clusters usually connate.
  b. Corolla almost regular, tubular, not ringent. 6. *L. sempervirens*
  b. Corolla 2-lipped, broadly funnel-form, ringent.
    c. Leaves pubescent on both sides; corolla 2–2.5 cm. long. 7. *L. hirsuta*
    c. Leaves glabrous, at least above; corolla 1–2 cm. long.
      d. Leaves entirely glabrous; corolla and ovary glabrous. 8. *L. dioica*
      d. *Leaves pubescent beneath; corolla pubescent outside, averaging longer than in no. 8; ovary densely glandular-atomiferous.* 8a. *L. dioica,* var. *glaucescens*

1. L. TATARICA L. TARTARIAN HONEYSUCKLE.

Pastures and banks, in gravelly and stony nonacid soils; frequent. May 10–June 15.
Escaped from cultivation: South Hill, near the "Incline" (Morse Chain Works), very abundant (*D.*!); Cascadilla Creek (*D.*); Fall Creek (*D.*!); Howland Point; shores of Cayuga Lake (*D.*!). A form on Frontenac Island and elsewhere has salmon-colored berries.
Me. to Ont., southw. to N. J. and Ky. Introduced from Asia.

2. **L. canadensis** Marsh. (*L. ciliata* of Cayuga Fl.) FLY HONEYSUCKLE.

Damp low woodlands, and sheltered, but often dry, ravine banks, in more or less calcareous gravelly and stony situations; common. May.
In the ravines of the basin and in the woods toward McLean, also in the richer gravels and cliffs of the valleys s. of Ithaca; rare in the more acid soil of the southern hills, and in the Junius sands.
E. Que. to Sask., southw. to Pa., Mich., Wis., and Minn.; rare or absent on the Coastal Plain.

3. **L.** XYLOSTEUM L.

Borders of thickets and in dry scrubby fields; occasional. May 25–June 5.
South Hill, by railroad near North Quarry, and s. of the quarry (*D.*); D., L. & W. R. R. along lower switchback, e. of Hudson St., Ithaca, 1894 (*K. M. W.*); C. U. campus, West Ave., 1915, and armory woods, 1915; Cayuga Lake shore between McKinneys and Esty, 1916 (*A. R. Bechtel & K. M. W.*).
Escaped from cultivation. Native of Europe.

4. **L. oblongifolia** (Goldie) Hook. SWAMP FLY HONEYSUCKLE.

Calcareous and sometimes brackish peaty swamps; scarce. June 1–20.
Headwaters Swamp (*D.* in C. U. Herb.); sparingly in Michigan Hollow Swamp (*D.*!); swamp at head of Lake Como (Locke Pond, *Dr. C. Atwood,* D.); Otter

[34] One plant each of *L. bella* Zabel and *L. notha* Zabel, two hybrid Loniceras, have been found on the banks about the Girls' Playground, Cascadilla Glen, but these are probably not established in the Cayuga Lake Basin.

Creek, Cortland (*D.*); Lowery Ponds (*D.!*); tamarack swamp w. of Savannah, in Galen (*D.!*); Crusoe Prairie; Westbury Bog; Miller Bog, Spring Lake; frequent *on the Ontario plain.*

N. N. B. to Man., southw. to Me., Vt., N. Y., w. Pa., Mich., and Minn.; rare or *absent in granitic N. E.* and on the Coastal Plain.

A form with yellow fruit occurs with the typical red-fruited form at Lowery Ponds.

5. **L.** JAPONICA Thunb. JAPANESE HONEYSUCKLE.

Dry sandy or gravelly banks; rare. June–July.

Escaped from cultivation: state road n. of *Enfield Glen; Fall Creek Gorge; edge* of thicket opposite Percy Field.

Locally abundant on the Coastal Plain; infrequent inland.

Naturalized from e. Asia.

6. **L.** SEMPERVIRENS L. TRUMPET HONEYSUCKLE.

Damp *gravelly thickets when not too acid;* scarce. July–Aug. 15.

Probably introduced: s. shore of Spencer Lake, 1919; border of a thicket in a rocky pasture, South Hill beyond the "Incline," now Morse Chain Works, 1883–1885 (*D.*); ravine bank near Kline Road, Forest Home, 1915; around Malloryville Bog, 1918; roadside s. of South Butler, 1916.

Native: Me. and N. Y. to Nebr., southw. to Fla. and Tex. Frequent in cultivation.

7. **L. hirsuta** Eaton.

Swamps, and moist or rarely dry thickets; rare. June.

Dry rocky thicket, top of North Pinnacle, Caroline; n. of Summit Marsh (*D.*); Freeville, w. of Auburn Div. of L. V. R. R. (*D.*). The soils at the above-named stations are not particularly calcareous.

W. N. E. and Ont. to Man., southw. to Pa., Ohio, and Mich.; apparently absent on the Coastal Plain.

8. **L. dioica** L.

Shaly ledges and talus, not usually in situations definitely calcareous; frequent. May 10–June 10.

In nearly all the ravines of the basin from Enfield northw. along the shores of Cayuga Lake, and on the lake cliffs; rare or absent away from the lake.

Que. (?) and s. Me. to Mass., southw. to N. C., Ohio, and Mo.; rare or absent on the Coastal Plain.

8a. **L. dioica** L., var. **glaucescens** (Rydb.) Butters. (See Clements, Rosendahl, and Butters, *Trees of Minnesota.* No. 402 of Cayuga Fl.)

Damp or rather dry sandy thickets, in neutral or somewhat acid soils; frequent. May 10–June 15.

On the chestnut soils of the higher hills s. of Ithaca: hilltops w. of North Spencer station; w. of West Danby; n. of Caroline Center; and elsewhere.

Ont. to Alberta, southw. to Pa., N. C., Ohio, and Nebr.

The local plants have yellowish flowers and strongly glandular-dotted, otherwise glabrous, ovaries. No specific line can be found between these plants and *L. dioica.* The corollas of *L. dioica* average longer than those of var. *glaucescens,* but the measurements overlap considerably. *L. dioica* sometimes, though less frequently, has a yellowish corolla, but this color is more characteristic of var. *glaucescens.* Specimens from Hemlock Lake, Ontario Co., are exactly like *L. dioica* but have pubescent foliage. The local plants resemble var. *dasygyna* Rehder as to the glandular nature of the ovary, but the ovary is not hirsute as in that variety.

3. Symphoricarpos (Dill.) Ludwig

a. Leaves pubescent beneath; plants mostly 2–10 dm. high. 1. *S. albus*
a. Leaves glabrous beneath; plants mostly 10–20 dm. high. 1a. *S. albus*, var. *laevigatus*

1. **S. albus** (L.) Blake. (See Rhodora **16**: 118. 1914. *S. racemosus* of Gray's Man., ed. 7. *S. racemosus* and var. *pauciflorus* of Cayuga Fl.)

Shaly and somewhat limy cliffs and talus; abundant in places. June 25–July 20.
Larger ravines of the basin, and the shores of Cayuga Lake: Enfield Glen (*D.*!); Six Mile Creek (*D.*); Fall Creek, below Ithaca Falls (*D.*!); lake cliffs, from McKinneys to Willets (*D.*!); Taughannock Gorge (*D.*!).
N. e. Que. to Alaska, southw. to w. Mass., Ont., Pa., Mich., Mont., and Calif.; rare or absent as a native plant on the Atlantic Coastal Plain.

1a. **S.** ALBUS (L.) Blake, var. LAEVIGATUS (Fernald) Blake. (*S. racemosus*, var. *laevigatus*, of Gray's Man., ed. 7.)

Roadsides and about old house sites, in rich soil; occasional. June 15–July.
Escaped from cultivation: near Ball Hill, Danby; Inlet Valley, near Enfield Glen; s. of Coy Glen; Brookton; Forest Home; near McKinneys; near Paine Creek.
Native: Que. to Wash., southw. locally in the mts. to Va.; widely cultivated.

4. Linnaea (Gronov.) L.

1. **L. borealis** L., var. **americana** (Forbes) Rehder. (*L. borealis* of Cayuga Fl.) TWIN-FLOWER.

In humus in damp mossy woods, more often under conifers; frequent. June.
Wood road n. w. of station, North Spencer; island in Summit Marsh (*D.*); near Summit of Saxon Hill (*D.*); roadside e. of West Danby station; open peaty meadow n. w. of Enfield Falls; Enfield Glen; Fir Tree Swamp, Danby (*D.*!); near Buttermilk Falls (*D.*); Cascadilla woods (*D.*); n. of Forest Home (*D.*); e. of Freeville Bog (*D.*!); hill s. of Willow Grove (*A. H. Wright*); s. bank *of Taughannock Gorge* (*D.*!); *Ludlowville* (*H. B. Lord*, D.); *arbor vitae swamp* e. of Clyde.
Lab. to B. C. and Alaska, southw. to N. J., Md., Pa., and Minn. Not a coastal plant.

5. Triosteum L.

a. Leaves velvety beneath. 1. *T. perfoliatum*, var. *aurantiacum*
a. Leaves glabrous or nearly so beneath. 1a. *T. p.*, var. *glaucescens*

1. **T. perfoliatum** L., var. **aurantiacum** (Bicknell) Wiegand. (See Rhodora **25**: 199. 1923. *T. aurantiacum* of Gray's Man., ed. 7.) FEVERWORT. HORSE GENTIAN.

Rich slopes and bottom lands, in gravelly, nearly neutral, soils; frequent. June.
Fairly common about the ravines of the basin, but scarce elsewhere; apparently rare in the McLean region and in the more residual acid soils of the higher hills: Enfield Glen; upper Buttermilk Glen; Six Mile Creek; Fall Creek; path n. of Mud Pond, McLean Bogs; Esty; Salmon Creek; Paine Creek; and elsewhere.
Que. to Conn. and in the mts to Va., and from N. Y. to Ill. and Wis.; infrequent or rare on the Coastal Plain.
This variety is highly variable in the Cayuga Lake Basin. One or two individuals with perfoliate leaves, but with other characters of the variety rather than of the

typical form, were found at Paine Creek. The pubescence of the stem and the ovaries may be crisp, as in *T. perfoliatum*, or villous, and the sepals may be narrow or broad, obtuse or acute.

1a. **T. perfoliatum** L., var. **glaucescens** Wiegand. (See Rhodora **20**: 116. 1918. *T. aurantiacum*, var. *glaucescens* Wiegand.)

In situations similar to the preceding; frequent. June.

Equally common with var. *aurantiacum*, and of the same distribution: Lick Brook; South Hill; Six Mile Creek; Fall Creek, above Forest Home; Renwick slope; Esty; in shaly talus, Ludlowville; bottom land, Paine Creek glen (type locality).

Cent. N. Y. and Pa.

A colony in Paine Creek glen, and another along the state road at Esty, had some plants with strongly perfoliate leaves but others with the leaves separate. The var. *glaucescens* resembles the acute-sepaled types of var. *aurantiacum* more closely than it does the typical form of the species.

6. **Viburnum** (Tourn.) L.

a. Cymes with marginal flowers much enlarged and neutral, very showy.
  b. Leaves pinnately veined, not lobed, scurfy beneath. 1. *V. alnifolium*
  b. Leaves palmately veined, 3-lobed.
    c. Leaves with short lobes, velvety-pubescent beneath. [*V. Opulus*]
    c. Leaves with long-acuminate curved lobes, sparingly pubescent or glabrous beneath; petiolar glands often slightly pedicelled; petiolar groove more open; branches less contorted. 2. *V. Opulus*, var. *americanum*

a. Cymes with all flowers alike, perfect.
  b. Leaves palmately veined, mostly 3-lobed, soft-downy beneath. 3. *V. acerifolium*
  b. Leaves pinnately veined, not lobed.
    c. Leaves coarsely toothed; veins straight, pinnately parallel, conspicuous.
      d. Blade very short-petioled or almost sessile, downy beneath; stipules conspicuous, usually exceeding the petiole. 4. *V. affine*, var. *hypomalacum*
      d. Blade long-petioled, glabrous or nearly so; stipules much shorter than the petiole, obsolete, or lacking. 5. *V. dentatum*
    c. Leaves finely crenate-serrate; veins irregular and inconspicuous.
      d. Cyme peduncled; leaves rarely acuminate; drupe 6–9 mm. long. 6. *V. cassinoides*
      d. Cyme sessile; leaves plainly acuminate; drupe 10–15 mm. long. 7. *V. Lentago*

1. **V. alnifolium** Marsh. (*V. lantanoides* of Cayuga Fl.) HOBBLE BUSH. WITCH HOBBLE.

Damp woodlands and on shaded ravine banks, in gravelly or shaly, apparently neutral or acid, soils; frequent. Apr. 20–May 20.

In the rich old woods of the hilltops in Spencer, Danby, and Caroline; Dry Run, Spencer; swamp above Newfield village; on the shaded s. slope of Enfield Glen; Six Mile Creek ravine (*D.*!); Fall Creek Gorge (*D.*!); Etna to Ringwood; McLean and Freeville swamps; Salmon Creek; and elsewhere.

N. B. and N. S. to Ont. and Mich., southw. to Conn. and N. Y. and in the mts. to N. C., Pa., and Tenn.

[**V. OPULUS** L.

Both the European (typical) and American forms of this species are cultivated on the C. U. campus and about Ithaca. The "double-flowered" variety of the Eu-

ropean form, with all the flowers enlarged, is the so-called "Snow-ball Bush." Occasionally plants of this species escape from cultivation, but whether they are the European or the American form, or both, is not known.

Native of Eu.]

2. **V. Opulus** L., var. **americanum** Ait. (See Rhodora **20**: 14. 1918. *V. Opulus* of *Cayuga Fl.*) HIGHBUSH CRANBERRY. CRANBERRY-TREE.

Wet gravelly calcareous places, mostly about swamps, rarely in drier situations; scarce. June.

Cayuta Lake swamp (*D.*); Michigan Hollow Swamp (*D.*!); Six Mile Creek (*D.* in C. U. Herb.); Indian Spring marsh, formerly (*D.*); Ellis Hollow; bog between Slaterville and Dryden Lake; Fir Tree Swamp, Freeville (*D.*); near Malloryville Bog; Mud Pond, McLean Bogs; Beaver Brook (*D.*!); Salmon Creek ravine, s. of Genoa (*A. H. Wright*); near East Butler; e. of Clyde. Occasionally escaping from cultivation: near Valentine Brook (*D.*); Lockwood Flats (*D.*).

Newf. and e. Que. to B. C., southw. to N. J., Pa., Mich., Wis., and Iowa. Found also in e. Asia.

One specimen of four collected at various times at Beaver Brook has the leaves as velvety beneath as the European type but is otherwise like the American type. A dwarf, highly stoloniferous, form, with blunt-lobed leaves, was found in Big Gully by W. C. Muenscher in 1923.

3. **V. acerifolium** L. MAPLE-LEAVED VIBURNUM. ARROW-WOOD.

Dry rocky or gravelly sterile woods, in acid soils; common. June.

Most abundant on the ravine crests of the basin, and on the crests of the cliffs along the shore of Cayuga Lake.

N. B. to Minn., southw. to Ga., Ala., and Mich.; frequent on the Coastal Plain.

4. **V. affine** Bush, var. **hypomalacum** Blake. (See Rhodora **20**: 11. 1918. *V. pubescens* of Gray's Man., ed. 7, and of Cayuga Fl.)

Dry rocky crests of ravines, and cliff crests, mostly in noncalcareous situations; frequent. June 1–20.

Top of Thatcher Pinnacles; Enfield Glen; between Lick Brook and Buttermilk Glen; Coy Glen; around South Hill Marsh; Fall Creek Gorge (*D.*!); common along the e. shore of the lake (*D.*!); frequent in the stony chestnut soils of the higher hills.

W. Que. and Vt. to Man., southw. to Ga., Ill., Iowa, and Wyo.; rare e. of the Allegheny Mts.

In Gray's Man., ed. 7, the habitat is given as "calcareous ridges and banks," but the above-named habitats are not calcareous.

5. **V. dentatum** L. ARROW-WOOD.

Swamps and along streams, in slightly acid or neutral soils; frequent. June.

S. of Caroline Depot; South Hill Marsh; Renwick woods; Ellis Hollow; Malloryville Bog; Mud Pond, McLean Bogs; Spring Lake; and elsewhere.

N. B. to Ont., southw. to Fla., w. N. Y., and possibly also to Mich. and Minn.; frequent on the Coastal Plain.

6. **V. cassinoides** L. WITHE-ROD. BLACK HAW.

Boggy acid soils; frequent. June.

Larch Meadow (*D.*); South Hill Marsh (*D.*!); Lake Como (Locke Pond, *D.*); Woodwardia Bog (*D.*!); Malloryville Bog (*D.*); McLean Bogs (*D.*!); Junius peat bogs; Featherbed Bog.

Newf. to Man. and Minn., southw. to N. J., Fla., and Ala.; common on the Coastal Plain.

Some of the above-named stations are in marly regions, but the plants may not be actually in calcareous soil.

7. **V. Lentago** L. NANNYBERRY. SHEEPBERRY.

Thickets and stream banks, in rich moist alluvial soils or sometimes in clay; frequent, and generally distributed. May 15–June 15.

Que. to Man., southw. to N. J., Ind., Kans., and Colo., and along the mts. to Ga.; infrequent or rare on the Coastal Plain.

7. Sambucus (Tourn.) L.

a. Inflorescence paniculate; corolla lobes reflexed, turning dark in drying; pith reddish; fruit coral-red. 1. *S. racemosa*

a. Inflorescence corymbose; corolla lobes spreading, not darkening in drying; pith white; fruit dark purple. 2. *S. canadensis*

1. **S. racemosa** L. RED-BERRIED ELDER.

Thickets, in rocky, stony, or gravelly, mostly neutral or acid, soils; frequent. May.

Hilltops of Spencer, Danby, and Caroline; South Hill; Cascadilla Glen; "Observation Hill," *McLean; Shurger Glen; rare in the northern and eastern parts* of the basin.

Newf. to B. C. or Alaska, southw. to Pa., Iowa, Colo., and Calif., and in the mts. to Ga.

2. **S. canadensis** L. COMMON ELDER.

Damp soils in fields, hedgerows, and lowlands, with little reference to lime content; frequent. June 20–July 20.

Generally distributed throughout the basin, except in the more sterile soils.

N. S. to Man., southw. to Fla., Kans., and Ariz.; frequent along the coast.

120. VALERIANACEAE (VALERIAN FAMILY)

a. Sepals of several plumose bristles; ovary 1-celled, 1-seeded; some leaves pinnatifid. 1. VALERIANA

a. Sepals minute, not plumose; ovary 3-celled, 1-seeded; no leaves pinnatifid. 2. VALERIANELLA

1. Valeriana (Tourn.) L.

a. Basal leaves usually entire; corolla 6–7 mm. long. 1. *V. uliginosa*

a. Basal leaves pinnate; corolla 4 mm. long. 2. *V. officinalis*

1. **V. uliginosa** (T. & G.) Rydb. (*V. sylvatica* of Cayuga Fl.) SWAMP VALERIAN.

Calcareous boggy places; rare. June.

In the Cayuga Lake Basin, confined to the Ontario plain, where it is frequent: "in *Herb. of J. J. Thomas*, from Junius; probably 1827" (*D.*); Savannah, 1883 (*Sartwell*, D.); swamp s. of South Butler in Savannah, 1916 (*L. Griscom, F. P. Metcalf, & A. H. Wright*); Westbury Bog (*A. H. Wright, A. J. E., & K. M. W.*). Distributed in N. Y. State from Bergen Swamp to Herkimer Co., and also at Pine Plains, Dutchess Co.

E. Que. to w. Ont. and Mich., southw. to Me., Vt., and cent. N. Y.

2. **V.** OFFICINALIS L. GARDEN VALERIAN. FALSE HELIOTROPE.

Escaped from cultivation to roadsides and thickets, in rich calcareous regions; occasional. June 15–July 15.

Roadside n. of Danby; Taughannock Gorge, in woods near hotel (*D.*!); near Locke (*D.*).

N. S. to N. J. and Ohio. Introduced from Eurasia.

2. Valerianella (Tourn.) Mill.

1. **V. LOCUSTA** (L.) Betcke. (*V. olitoria* of Cayuga Fl.) CORN SALAD.

Fields and waste places, in rich gravelly soils; rare. May.

Mouth of ravine n. of Lick Brook, 1912 (*H. P. Brown*); roadside s. of Ithaca, 1892 (*W. W. Rowlee*); pasture n. of lower Coy Glen, 1894 (*K. M. W.*), 1919 (*A. H. Wright*); Frontenac Island, 1882 (*Mrs. S. J. Brun, D.*).

Me. to Ont., southw. to N. J., Va., La., Ark., and Idaho. Naturalized from Eu.

121. DIPSACACEAE (TEASEL FAMILY)

a. Heads large, 5–10 cm. long, oblong, cone-like, many-flowered; chaff among the flowers with conspicuous long stiff points; stems prickly. 1. DIPSACUS

a. Heads more globular, 1–2 cm. long, fewer-flowered; chaff not as above; stems not prickly.

b. Chaff herbaceous, without rigid points; no leaves pinnatifid; calyx limb of 5 minute teeth; involucels prismatic. 2. SUCCISA

b. Chaff wanting, but receptacle hairy; leaves mostly pinnatifid; calyx limb of 8–10 awns; involucels compressed. 3. KNAUTIA

1. Dipsacus (Tourn.) L.

a. Chaff straight-pointed. 1. *D. sylvestris*

a. Chaff with uncinate tips. [*D. fullonum*]

1. **D. SYLVESTRIS** Huds. WILD TEASEL.

Pastures, roadsides, and fields, in rich damp clayey or mucky, probably calcareous, soils; rather common. July–Oct.

Generally distributed throughout the basin, except in the sandy soils and in the chestnut soils of the higher hills.

Me. to Mich., southw. to N. C.; rare or absent on the Coastal Plain. Naturalized from Eurasia.

[**D. FULLONUM** L. FULLER'S TEASEL.

An occasional escape in regions where it is cultivated, as about Auburn and Skaneateles.]

2. Succisa (Rupp.) Neck.

1. **S. AUSTRALIS** (Wulf.) Reichenb. (*Scabiosa australis* of Cayuga Fl.) DEVIL'S BIT.

Wet sandy, more or less calcareous, soils; local. July 25–Sept.

Near the shore of Cayuga Lake from Farley Point and Lockwood Flats to Union Springs and marsh n. of village (*D.*!), probably escaped from the garden of Prof. J. J. Thomas at Union Springs, where it was grown early in the 19th century (*D.*); Big Gully; Frontenac Island (*D.*); n. of Montezuma village. [Found also at Auburn, 1920 (*Jennie B. Youngs*).]

Mass., N. Y., and Pa. Naturalized from Eu.

3. Knautia L.

1. **K. ARVENSIS** (L.) T. Coult. FIELD SCABIOUS.

Dry waste places, in gravelly soils; rare. June.

Cayuga Heights below Cayuga Heights Road, behind the residence of Prof. Dietrich (*A. J. E. & L. H. MacDaniels*); abundant in this location.

Newf. and N. E., to N. Y. and Pa. Adventive from Eu.

This genus is apparently distinct from Scabiosa.

122. CUCURBITACEAE (GOURD FAMILY)[35]

a. Leaves shallowly 5-angled; plant clammy-pubescent; fruit about 1.5 cm. long, 1-celled, 1-seeded. 1. SICYOS
a. Leaves sharply and more deeply 5-lobed; plant nearly glabrous; fruit about 5 cm. long, 2-celled, usually 4-seeded. 2. ECHINOCYSTIS

1. Sicyos L.

1. **S. angulatus** L. ONE-SEEDED BUR CUCUMBER.

Damp borders of streams and marshes, in rich alluvial soils and in damp waste places; frequent. Aug.–Sept.

Near Lick Brook; Negundo Woods (*D.*); scattered over the area between Ithaca and Cayuga Lake (*D.*!); Cascadilla Glen; Fall Creek Gorge; Shurger Glen (*D.*); near Ludlowville (*D.*); and elsewhere.

S. Me. and w. Que. to S. Dak., southw. to Fla., e. Kans., and Tex.; occasional on the Coastal Plain.

2. Echinocystis T. & G.

1. **E. lobata** (Michx.) T. & G. WILD CUCUMBER. BALSAM-APPLE.

Damp borders of streams and marshes, in rich alluvial soils, and in damp waste places; scarce. Aug.

Negundo Woods (*D.*); occasional over the area between Ithaca and Renwick; Fall Creek, at Forest Home; Canoga Marshes; and elsewhere. Commonly cultivated and freely escaping, but probably native here.

N. B. to Man. and Mont., southw. to Pa., Ga., Ky., Kans., and Tex.; *occasional* on the Coastal Plain.

123. CAMPANULACEAE (BLUEBELL FAMILY)

a. Flowers axillary, solitary, sessile, the early ones cleistogamous; capsule slender-cylindric or prismatic. 1. SPECULARIA
a. Flowers in a terminal inflorescence, none cleistogamous; capsule obconic to globose. 2. CAMPANULA

1. Specularia (Heist.) Fab.

1. **S. perfoliata** (L.) A. DC. VENUS'S LOOKING-GLASS.

Dry open sterile gravelly or rocky places, in acid soils; frequent. June–July.

N. of Enfield Glen; C. U. campus, e. of Caldwell Hall; n. of Beebe Lake; Renwick slope; Cayuga Heights; and elsewhere.

Me. to B. C., southw. to Fla., La., Mex., Ariz., and Oreg., including the Atlantic Coastal Plain.

2. Campanula (Tourn.) L.

a. Flowers nearly sessile, in spikes or racemes.
  b. Corolla campanulate; style straight; capsule with pores at the base. 1. *C. rapunculoides*
  b. Corolla rotate; style declined; capsule with apical pores. 2. *C. americana*
a. Flowers long-peduncled, in loose panicles or corymbs.
  b. Stem smooth; corolla 15–25 mm. long. 3. *C. rotundifolia*
  b. Stem retrorse-scabrous; corolla 5–10 mm. long. 4. *C. uliginosa*

[35] *Cucurbita maxima* Duch. (squash) springs up occasionally on garbage dumps but is not established.

1. **C. rapunculoides** L. BELL-FLOWER.

Rich gravelly roadsides and banks, or occasionally along creeks; frequent. June-Aug.

W. of Newfield station; South Hill, near railroad; East Hill (*D.*!); Six Mile Creek (*D.*!); Cascadilla Creek, above Eddy Pond; Snyder Hill (*D.*); Ringwood; n. of McLean; Asbury; Tarbells; and elsewhere.

Newf. to Ont., southw. to N. Y., Pa., and Ohio. Introduced from Eurasia.

The plants in this region are mostly intermediate between the typical form and var. *ucranica* (Bess.) C. Koch, the leaves being hairy or almost smooth, and the ovary minutely scabrous or rarely glabrous.

2. **C. americana** L. TALL AMERICAN BELL-FLOWER.

Thickets in rich soil toward the base of valley slopes; rare. July 15-Aug.

Renwick slope, between Renwick and Fall Creek (*D.*!); near s. w. corner of Cayuga Lake (*D.*).

Ont. and N. Y. to Nebr., southw. to Fla. and Ark.; rare or absent along the coast. A plant of the rich soils of the Mississippi Basin.

3. **C. rotundifolia** L. HAREBELL. BLUEBELL.

Damp or dry calcareous cliffs, in the ravines, and along the lake shore; frequent. June-Oct.

Enfield Glen; Fall Creek Gorge; Taughannock Gorge; and elsewhere.

N. J., Pa., Ill., and Nebr., northw. to the Arctic regions, southw. in the Rocky Mts. to Ariz., and in Calif. Found also in Eurasia.

4. **C. uliginosa** Rydb. (*C. aparinoides* of Cayuga Fl.) MARSH BELL-FLOWER.

Marly meadows and marshes; frequent. July-Aug.

Summit Marsh; Larch Meadow (*D.*); Indian Spring, formerly (*D.*); Mud Pond, McLean Bogs; Dryden Lake; Junius marl ponds; and elsewhere.

Que. to Man., southw. to Conn., N. Y., and Mich.

This species is more northern than *C. aparinoides*, and inland rather than coastal. Apparently it differs also from that species in preferring more calcareous soils.

124. LOBELIACEAE (LOBELIA FAMILY)

1. Lobelia (Plum.) L.

a. Flowers large, 2-4 cm. long.
  b. Corolla scarlet, rarely paler. — 1. *L. cardinalis*
  b. Corolla blue. — 2. *L. siphilitica*
a. Flowers smaller, 1 cm. long or less, blue, bluish, or white.
  b. Stem wand-like, unbranched; leaves elliptic, chiefly basal; raceme spike-like; flowers nearly sessile. — 3. *L. spicata*
  b. Stem not wand-like, usually branched, leafy.
    c. Leaves ovate-lanceolate; plant hairy; racemes spike-like; ovary much enlarged in fruit. — 4. *L. inflata*
    c. Leaves linear or linear-oblanceolate; plant glabrous or sparingly pubescent below, slender; racemes loose, pedicels 5 mm. long or more; ovary scarcely enlarged in fruit. — 5. *L. Kalmii*

1. **L. cardinalis** L. CARDINAL-FLOWER.

Stream banks, pond shores, and swales, occasionally in clays, most abundant in calcareous gravels; frequent. July 20-Sept. 1.

Abundant near Spencer Lake and Summit Marsh (*D.*!); White Church valley (*D.*!); marshes near the Inlet and Fall Creek (*D.*); "especially abundant about some of the Cortland marl ponds" (*D.*!); Asbury; Cayuga Marshes (*D.*); Ellis

Hollow (*D.*); and elsewhere. A pale pink form (forma *rosea* St. John, see Rhodora 21: 217, 1919) occurs n. of Spencer Lake and in Summit Marsh.

S. N. B. to Ont., Kans., and Colo., southw. to Fla. and Tex.; frequent on the Coastal Plain, where it apparently inhabits more acid soils than here.

2. **L. siphilitica** L. GREAT LOBELIA.

Calcareous springy places; abundant. Aug.–Sept.

Generally distributed throughout the basin where calcareous springs occur; rare in the more acid regions on the higher hills.

Me. and Ont. to S. Dak. and Colo., southw. to Ga., La., and Kans.; rare or absent on the Coastal Plain.

3. **L.** SPICATA **Lam.**

Damp sandy pasture lands; rare. July–Sept.

About one mile e. of McLean (*L. H. MacDaniels, A. J. E., & K. M. W.*); first detected in 1915 and appearing as though recently introduced.

Native: P. E. I. to Sask., southw. to Fla., Ala., and Tex.; frequent on the Coastal Plain.

This species generally inhabits neutral or slightly acid sandy or gravelly soils.

4. **L. inflata** L. INDIAN TOBACCO. LOBELIA.

Dry open soils of various types; common. July–Sept.

Generally distributed throughout the basin, and appearing like a weed; less abundant in the richer soils.

Lab. to Sask., southw. to Ga., Kans., and Ark., including the Coastal Plain. A well-known poisonous medicinal plant.

5. **L. Kalmii** L.

Wet marly ledges, springs, and shores; frequent. July–Sept.

Newf. to Man. and Minn., southw. to N. J., Ohio, Mich., and Iowa; rare or absent on the Coastal Plain and in acid N. E.

Two forms occur in the Cayuga Lake Basin:

(*a*) Strict, slender, usually unbranched; the branches, if present, erect; leaves narrowly linear. Marly shores and bogs: Spencer Lake; Larch Meadow (*D.*); Farley Point (*D.!*); Vandemark Pond; Lowery Ponds; Miller Bog, Spring Lake.

(*b*) Lower, stouter, more diffuse, often much branched; leaves longer and proportionally broader, linear-oblanceolate. Marly ledges in the ravines and on the lake shores: Enfield Glen (*D.*); Buttermilk Glen (*D.!*); Six Mile Creek (*D.*); Cascadilla Glen (*D.*); Fall Creek Gorge (*D.!*); Taughannock Gorge (*D.!*); Salmon Creek ravine (*D.!*).

Whether these forms are more than ecological in nature is not at present known.

125. COMPOSITAE (COMPOSITE FAMILY)

ARTIFICIAL KEY TO THE GENERA

PAGE

a. Flowers of the head tubular, or only the marginal ones ligulate; juice not milky. (2d *a*, p. 396.)

b. Involucre of the pistillate flowers closed and woody; heads unisexual, not radiate, the staminate and the pistillate heads very different in appearance.

c. Pistillate heads forming an oblong or an oval bur, covered with hooked or rarely straight spines............................15. XANTHIUM 414

c. Pistillate heads obovoid, small, with a few acute tubercles at the summit. 14. AMBROSIA 413

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b. Involucre not closed nor woody.
c. Heads without rays.
d. Pappus composed of awns, often barbed....................19. BIDENS 416
d. Pappus composed of scales; involucral bracts hooked, forming a bur. 31. ARCTIUM 423
d. Pappus none or a mere crown (see also 4th *d*).
e. Corollas large, deeply lobed; flowers pink, purple, or white; involucral bracts usually fimbriate............................36. CENTAUREA 426
e. Corollas small, dentate; flowers yellow or yellowish white.
f. Receptacle chaffy; heads large, 1–2 cm. in diam.; leaves very large, thin, and lobed............................13. POLYMNIA 413
f. Receptacle naked; heads and leaves smaller, the leaves often dissected.
g. Heads corymbose, erect........................25. TANACETUM 421
g. Heads paniculate, racemose, or spicate, chiefly nodding. 26. ARTEMISIA 421
d. Pappus capillary.
e. Involucral bracts scarious throughout; plants more or less white-woolly.
f. Basal leaves much larger than the cauline leaves and differing from them in shape............................9. ANTENNARIA 408
f. Basal leaves wanting, or, if present, similar to the cauline leaves.
g. Involucre papery-white, the bracts finely striate, spreading. 10. ANAPHALIS 411
g. Involucre yellowish white or brownish, the bracts subappressed, not striate ....11. GNAPHALIUM 412
e. Involucral bracts not wholly scarious, or, if so, the plants not white-woolly.
f. Involucral bracts in one series, often with minute bracts at base.
g. Plants climbing or twining........................2. MIKANIA 398
g. Plants not climbing nor twining.
h. Leaves all basal..............................28. PETASITES 423
h. Leaves cauline.
i. Marginal flowers pistillate only; heads 15–20 mm. long. 29. ERECHTITES 423
i. Marginal flowers perfect; heads 7–10 mm. long..30. SENECIO 423
f. Involucral bracts in 2–many series.
g. Foliage spiny.
h. Heads 1-flowered, in capitate clusters..........32. ECHINOPS 424
h. Heads many-flowered, distinct.
i. Receptacle densely bristly.
j. Pappus not plumose........................33. CARDUUS 424
j. Pappus plumose ....34. CIRSIUM 424
i. Receptacle not bristly......................35. ONOPORDUM 425
g. Foliage not spiny.
h. Corolla deeply lobed; involucral bracts fimbriate or dentate; receptacle bristly ....36. CENTAUREA 426
h. Corolla merely toothed; involucral bracts entire; receptacle naked ....1. EUPATORIUM 397
c. Heads with ray and disk flowers.
d. Pappus of awns.
e. Involucre very glutinous; receptacle not chaffy.........3. GRINDELIA 398
e. Involucre not glutinous; receptacle chaffy................19. BIDENS 416

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d. Pappus of scales, which are sometimes deciduous (see also 3d *d* and 4th *d*).
e. Receptacle chaffy.
f. Rays white; heads very small.......................20. GALINSOGA 419
f. Rays yellow; heads large.........................18. HELIANTHUS 415
e. Receptacle not chaffy; rays yellow...................21. HELENIUM 420
d. Pappus none or a mere crown (see also 4th *d*).
e. Receptacle not chaffy; rays white or pinkish.
f. Rays more than 30; low scapose plants..................5. BELLIS 402
f. Rays less than 30; leafy plants............24. CHRYSANTHEMUM 421
e. Receptacle chaffy.
f. Rays white.
g. Heads small, 3–7 mm. in diam.; achenes flattened..22. ACHILLEA 420
g. Heads large, 13–30 mm. in diam.; achenes terete..23. ANTHEMIS 420
f. Rays yellow.
g. Rays neutral ....17. RUDBECKIA 414
g. Rays pistillate.
h. Disk flowers perfect, but sterile; leaves large, thin, and lobed; plant hairy ....13. POLYMNIA 413
h. Disk flowers perfect and fertile; leaves smaller; plant pubescent or glabrous.
i. Leaves dissected ....23. ANTHEMIS 420
i. Leaves undivided, ovate.....................16. HELIOPSIS 414
d. Pappus capillary; receptacle not chaffy.
e. Rays yellow, or rarely cream color.
f. Involucral bracts in one series, often with minute bractlets at base.
g. Heads solitary, on scapose scaly-bracted stems, appearing before the leaves ....27. TUSSILAGO 422
g. Heads several, on leaf-bearing stems...............30. SENECIO 423
f. Involucral bracts in 3–many series.
g. Heads large, 2.5–10 cm. in diam.....................12. INULA 412
g. Heads small, 0.5–1.5 cm. in diam..................4. SOLIDAGO 398
e. Rays violet, purple, blue, or white.
f. Involucral bracts in 1–2 series.
g. Leaves large, reniform, basal....................28. PETASITES 423
g. Leaves smaller, obovate or narrower, cauline and basal. 7. ERIGERON 407
f. Involucral bracts in 3–5 series.
g. Bracts firm; rays few (3–6), white; leaves spatulate or obovate; heads corymbose ....8. SERICOCARPUS 408
g. Bracts membranous or herbaceous; rays mostly more numerous, white, purple, or blue; leaves various; heads corymbose or paniculate ....6. ASTER 403
a. Flowers of the head all ligulate; juice usually milky.
b. Pappus none ....37. LAPSANA 427
b. Pappus of scales...38. CICHORIUM 427
b. Pappus of bristles or hairs.
c. Bristles plumose (seen best when mature and dry).
d. Receptacle chaffy; leaves not grass-like............39. HYPOCHAERIS 427
d. Receptacle not chaffy, sometimes setose.
e. Leaves linear, grass-like, cauline...................42. TRAGOPOGON 427
e. Leaves not grass-like.
f. Plant scapose; inner achenes beaked................40. APARGIA 427
f. Plant leafy-stemmed; achenes all alike, not beaked......41. PICRIS 427

c. Bristles simple, often serrate. PAGE

d. Achenes spiny or strongly papillose near the summit, beaked.

e. Plant tall and branched; heads many...............43. CHONDRILLA 428

e. Plant scapose, unbranched; head solitary............44. TARAXACUM 428

d. Achenes smooth, rugose, or papillose throughout, beaked or beakless.

e. Achenes flat.

f. Body of achene truncate at summit; heads large, 12–40 mm. in diam., subcorymbose ....45. SONCHUS 428

f. Body of achene beaked or with a narrow neck; heads small, 4–10 mm. in diam., paniculate.........................46. LACTUCA 429

e. *Achenes not distinctly flattened or beaked.*

f. Flowers pale purplish white, brownish, or cream color; heads pendulous ....48. PRENANTHES 431

f. Flowers yellow or reddish; heads erect.

g. Pappus white; *basal leaves usually runcinate.........47. CREPIS* 431

g. Pappus tawny; none of the leaves runcinate or pinnatifid. 49. HIERACIUM 432

1. Eupatorium (Tourn.) L.

a. Florets pale purple; bracts of the involucre purple-tinged, numerous, very unequal, several of the lower ones very short; leaves whorled.

b. Florets 9–15, scarcely exserted; corolla 5 mm. long; inflorescence with divisions generally flat-topped, purple; stem usually conspicuously speckled with dark purple, scarcely glaucous, not more purple at the nodes; leaves finely crisp-puberulent beneath. 1. *E. maculatum*

b. Florets 3–6 (7), much exserted; corolla (5) 5.5–7 mm. long; inflorescence convex, pale purple; stem scarcely speckled, glaucous, deep purple at the nodes; leaves with looser pubescence beneath. 2. *E. falcatum*

a. Florets white; bracts greenish, fewer, less unequal; leaves opposite.

b. Leaves sessile; bracts unequal.

c. Leaves connate; bracts acute. 3. *E. perfoliatum*

c. Leaves separate; bracts obtuse. 4. *E. sessilifolium*

b. Leaves petioled; bracts nearly equal. 5. *E. urticaefolium*

1. **E. maculatum** L. (See Rhodora **22**: 57. 1920. *E. purpureum*, in part, of Cayuga Fl.) JOE-PYE WEED.

Open grounds and the borders of thickets, along streams and in wet sedgy meadows, in rich, often mucky, scarcely sandy, soil, generally in calcareous regions; common. Aug.–Sept.

Newf. and Que. to Mich. and B. C., southw. to s. Pa., Ill., and N. Mex.; rare or absent on the Atlantic Coastal Plain.

2. **E. falcatum** Michx. (See Rhodora **22**: 57. 1920. *E. purpureum*, in part, of Cayuga Fl.) JOE-PYE WEED.

Open woods and wood borders, in damp or rather dry rich light soil; frequent. Aug.–Sept.

Enfield Glen, midway, and below the lower falls; s. crest of Buttermilk Glen; Beebe Lake; Glenwood Road; North Lansing; Paine Creek; Utt Point; Big Gully; w. of Lowery Ponds; s. w. of Spring Lake.

E. Mass. to Wis., southw. to Ga. and Okla.; rare or absent on the Coastal Plain.

3. **E. perfoliatum** L. BONESET. THOROUGHWORT.

Low open grounds, apparently without much soil preference; common, and generally distributed. Aug.–Sept.

N. S. and N. B. to Man., southw. to Fla., Tex., and Nebr., including the Coastal Plain.

4. E. sessilifolium L. UPLAND BONESET.

Dry cliffs and talus of ravines and on steep banks in the less acid soils; scarce. Aug.–Sept.

Enfield Glen (*D.*); Fall Creek Gorge, below Ithaca Falls (*D.*!); near the "Nook" (*D.*); Cayuga Lake shore, s. of Shurger Glen (*D.*!) and n. of Myers Point (*D.*).

Vt. and Mass. to Ill., southw. to Ga., Ala., and Mo.; infrequent or rare on the Coastal Plain.

5. **E. urticaefolium** Reich. (*E. ageratoides* of Cayuga Fl.) WHITE SNAKEROOT.

Damp shaly ravine banks and damp shady gravelly hillsides, in more or less calcareous soils; common. Aug.–Sept.

Rare or absent on the more residual acid soils of the higher hills of the basin, and in the sandy regions n. of Cayuga Lake.

N. B. to Nebr., southw. to Fla. and La.; infrequent or more often absent on the Coastal Plain.

2. Mikania Willd.

1. **M. scandens** (L.) Willd.

Wet thickets bordering streams, and in marshes, in more or less brackish regions; locally frequent. Aug.

Cayuga Marshes (*D.*!); Spring Lake.

S. Me. to w. Ont., southw. to Fla., Miss., and Tex., chiefly near the coast. Found also in W. I. and S. A.

3. Grindelia Willd.

1. **G.** SQUARROSA (Pursh) Dunal.

Dry gravelly pastures, in nonacid soils; rare. Aug.–Sept.

Pasture between C. U. barns and Forest Home; recently introduced as a weed from the West. First noted in 1913, but now apparently well established.

Ill. to Man., southw. to Mo., Tex., Nev., and Mex.; adventive in Conn., N. Y., and N. J.

4. Solidago L.

a. Heads paniculate, thyrsoid, or in axillary clusters.
  b. Involucral bracts strongly squarrose. — 1. *S. squarrosa*
  b. Involucral bracts with erect or appressed tips.
    c. Flowers cream color. — 2. *S. bicolor*
    c. Flowers yellow.
      d. Heads mostly in axillary clusters.
        e. Leaves lanceolate. — 3. *S. caesia*
        e. Leaves ovate or oval. — 4. *S. latifolia*
      d. Heads in a terminal panicle.
        e. Leaves markedly increasing in size down the stem; lower and radical leaves usually present.
          f. Foliage glabrous and smooth, or nearly so; stem slightly angled or terete.
            g. Heads not secund on the branches of the panicle. — 5. *S. humilis*
            g. Heads secund.
              h. Lower leaves lanceolate or oblong-lanceolate, inconspicuously toothed.
                i. Branches of the panicle pubescent; panicle narrow; plants of wet soil.
                  j. Leaves linear-lanceolate, the upper ones much reduced and narrow. — 6. *S. uniligulata*
                  j. Leaves oblong-lanceolate, the upper ones elliptic-lanceolate, not so reduced. — 6a. *S. uniligulata*, var. *neglecta*

i. Branches of the panicle glabrous; panicle widely spreading; plants of dry soil. 7. *S. juncea*

h. Lower leaves elliptic-oval, sharply and coarsely serrate; branches of the panicle pubescent; plants of dry soil. 8. *S. arguta*

f. Foliage very scabrous; stem strongly angled, especially above; branches of the panicle usually distant, generally strongly divaricate (see also 3d *f*). 9. *S. patula*

f. Foliage crisp-puberulent, canescent. 10. *S. nemoralis*

e. Leaves not markedly increasing in size downward; lower and radical leaves usually absent.

f. Leaves rugose-veiny, not triple-ribbed.

g. Stem villous. 11. *S. rugosa*

g. Stem glabrous, or puberulent toward the summit.

h. Branches of the panicle short; rays about 4; plants of damp or boggy soil. 11a. *S. rugosa*, var. *sphagnophila*

flowerless toward the base; rays 6–9; plants of dry rocky soil. 12. *S. ulmifolia*

h. Branches of the panicle few, very long and wide-spreading, mostly

f. Leaves not rugose-veiny, triple-ribbed.

g. Stem smooth and glaucous (except in the panicle); involucre 3.2–5 mm. long.

h. Leaves glabrous. 13. *S. serotina*

h. Leaves pubescent on the veins beneath. 13a. *S. serotina*, var. *gigantea*

g. Stem puberulent or villous, at least above, not glaucous.

h. Involucre 3.2–4.5 mm. long; leaves inconspicuously toothed; stem crisp-pubescent. 14. *S. altissima*

h. Involucre 2–2.8 mm. long; leaves sharply toothed.

i. Stem sparingly crisp-pubescent above, glabrous below; leaves pubescent only along the veins beneath, narrow. 15. *S. canadensis*

i. Stem villous above, pubescent to near the base; leaves pubescent all over beneath, often scabrous above, usually broader; plant generally taller. 15a. *S. canadensis*, var. *Hargeri*

a. Heads corymbose.

b. Heads separate; basal leaves enlarged. 16. *S. ohioensis*

b. Heads in glomerules; basal leaves not enlarged, mostly absent.

c. Branches of the inflorescence and leaves glabrous or very nearly so. 17. *S. graminifolia*

c. Branches of the inflorescence and leaves hirtellous. 17a. *S. graminifolia*, var. *Nuttallii*

1. S. squarrosa Muhl.

Dry stony or rocky sandstone crests and gravelly hillsides, often in open woods; frequent. Aug. 20–Sept.

Higher hills s. of Ithaca, crests of most of the ravines of the basin, and along the cliffs of Cayuga Lake: Connecticut Hill; North Spencer; White Church; Cascadilla Creek; Fall Creek; Kidders; Paine Creek; and elsewhere.

E. Que. to Ont., southw. to Va., Ga., and Ohio; rare or absent on the Coastal Plain. An Alleghenian plant of noncalcareous regions.

2. S. bicolor L.

Open thickets and the borders of woods, in dry, thin, sandy or gravelly, acid or at least sterile, soils; common. Aug. 15–Sept. 25.

Generally distributed in the basin where the foregoing conditions obtain; absent on the richer soils.

P. E. I. to Ga., mostly in the mts. and along the coast; rare inland to Ky., Ohio, and Minn.

3. **S. caesia** L.

Dry open woods, in shallow soils of clay, gravel, or mixed clay and gravel; common. Sept. 5–Oct. 15.

Generally distributed throughout the basin, but much less frequent in the more sandy acid soils.

S. Me. to Minn., southw. to Fla., Ark., and Tex.; less common on the Coastal Plain.

4. **S. latifolia** L. (*S. flexicaulis* of many authors, doubtfully of L.)

Moist or somewhat dry sheltered woods and thickets, in shale talus, shallow gravel, or clay; frequent. Aug. 15–Sept. 10.

Most abundant about the ravines of the basin, scarce in the more acid sandy soils of the higher hills, and rare or absent on the richer clays and alluviums.

N. S. and N. B. to S. Dak., southw. to Ga., Tenn., and Kans.; rare on the Coastal Plain.

5. **S. humilis** Pursh. (See Rhodora 17: 6. 1915. *S. uliginosa* of Gray's Man., ed. 7, and of Cayuga Fl.)

Boggy calcareous meadows; scarce. Sept.

Larch Meadow (D.); Mud Creek, Freeville (D.); McLean Bogs (D.); tamarack swamp n. of Crusoe Lake.

Newf. to Man., southw. to N. C., Pa., Wis., and Minn.; rare or absent on the Coastal Plain.

6. **S. uniligulata** (DC.) Porter. (*S. neglecta*, var. *linoides*, of Cayuga Fl.)

Boggy and springy places, usually in marly soil; scarce. Sept.–Oct. 15.

Mud Pond, McLean Bogs; Newton and Lowery Ponds (*D.*!); Crusoe Prairie; Spring Lake; Westbury Bog.

Newf. to Ont. and Ill., southw. to N. J. and Pa., including the Coastal Plain.

6a. **S. uniligulata** (DC.) Porter, var. **neglecta** (T. & G.) Fernald. (See Rhodora 23: 292. 1921. *S. neglecta* of Gray's Man., ed. 7, and of Cayuga Fl.)

Habitat similar to the preceding; occasional. Aug. 10–Sept.

Larch Meadow (*D.*!); Mud Creek, Freeville; boggy field, Malloryville; vicinity of McLean Bogs (*D.*).

N. S. to Wis., southw. to Md. and Ill., including the Coastal Plain.

No good specific lines can be drawn between the species and its broader-leaved variety; not even the difference in number of rays seems constant. Plants of this species with narrow panicles are frequently confused with *S. humilis*. Stations in the Cayuga Lake Basin are all more or less limy, though both this plant and the typical form are at least frequent in the more acid soils of the Coastal Plain.

7. **S. juncea** Ait.

Dry fields and open thickets, in sandy or gravelly, limy or acid, sterile soils; common. July–Aug.

Nearly or quite absent on the clays and richer soils of the basin.

N. B. to Sask., southw. to Ga. and Mo., including the northern Coastal Plain.

This species and *S. serotina* begin to flower earlier in this region than do other species of goldenrod.

8. **S. arguta** Ait.

Dry stony or rocky noncalcareous sandstone crests and hillsides, or in sandy woods; frequent. Aug.-Sept.

Frequent in the chestnut soils of the higher hills of the basin, on the ravine crests, along the shores of Cayuga Lake, and in the sandy country n. of the lake; rare in the McLean region (found near Mud Pond, McLean Bogs), and on the clays and richer soils of the basin. Dudley mentions the species as inhabiting *sphagnum swamps, but it is not now known in such locations. From the context*, it seems that Dudley's plants may have been forms of *S. patula* Muhl., and an old specimen from "Malloryville Marsh" in the C. U. Herbarium, labeled *S. arguta*, is *S. patula*.

W. Me. to Ont., southw. to N. C. and Tenn., mostly in the mts.; infrequent or rare on the Coastal Plain.

9. **S. patula** Muhl.

Marl springs and meadows; frequent. Sept.

Larch Meadow; Coy Glen; Fall Creek, toward Varna; e. of Freeville station; Mud Creek, Freeville; McLean Bogs; and elsewhere.

W. Me. to Minn., southw. to Ga., Mo., and Tex.; rare or absent on the Coastal Plain.

10. **S. nemoralis** Ait.

Dry gravelly or sandy sterile fields, mostly in noncalcareous soils; common. Aug. 20-Sept.

Generally distributed throughout the basin, but most abundant in the chestnut soils of the higher hills and along the shores of Cayuga Lake.

P. E. I. to Sask., southw. to Fla., Tex., and Ariz.; common along the coast.

11. **S. rugosa** Mill.

Dry fields and hedgerows, in gravelly soils; common. Aug. 20-Sept.

Abundant in the more sterile soils of the hills of the basin, as well as in the more calcareous gravels of the McLean region, and even in the alluvium; less abundant, or rare, in the clays.

Newf. to w. Ont., southw. to Fla. and Tex., including the Coastal Plain.

11a. **S. rugosa** Mill., var. **sphagnophila** Graves.

Boggy meadows; rare. Aug. 1-Sept. or rarely Oct.

Moor of Lowery Ponds (*F. P. Metcalf*); Westbury Prairie (*F. P. Metcalf & A. H. Wright*). In both these localities the plants grow in marly and sedgy meadows.

E. Mass. to Conn. and N. Y.

12. **S. ulmifolia** Muhl.

Dry rocky or stony banks, where the soils are not too acid and where there is some admixture of clay; scarce. Aug. 15-Sept.

Fall Creek, n. of Beebe Lake (*D.*!) and below Ithaca Falls (*D.*!); "somewhat abund. north of Myers Point" (*D.*); s. of Willets station (*D.*); Big Gully (*D.*).

N. S. and s. Me. to Minn., southw. to Ga., Mo., and Tex.; infrequent on the Coastal Plain.

13. **S. serotina** Ait.

Fields and thickets, on low or at least poorly drained soils of very diverse types; common. July 15-Sept.; early-flowering.

N. B. and N. S. to B. C., southw. to Ga., Tex., and Utah; infrequent on the Atlantic Coastal Plain.

13a. **S. serotina** Ait., var. **gigantea** (Ait.) Gray.

In situations similar to the preceding; common. Aug.–Sept.

E. Que. to Ill., southw. to N. Y., Tenn., Miss., and La.; infrequent or rare on the Coastal Plain.

14. **S. altissima** L. (*S. canadensis* of Cayuga Fl., in part.)

Borders of thickets, if not too dry, in light and possibly calcareous soils; common. Sept.

N. Me. to Mich., southw. to Ga., Tex., and Nebr., including the Coastal Plain.

15. **S. canadensis** L.

Fields and thickets, in damp sandy or gravelly soils, without apparent relation to lime; rare. Aug. 10–Sept.

Border of Spencer Lake (*C. C. Thomas & K. M. W.*); field s. of McLean (*A. R. Bechtel & K. M. W.*).

Newf. to N. Dak., southw. to W. Va. and Ky.; apparently infrequent or rare on the Coastal Plain.

15a. **S. canadensis** L., var. **Hargeri** Fernald. (See Rhodora 17: 11. 1915. *S. canadensis* of Cayuga Fl., in part.)

Dry fields and thickets, in the heavier soils; very common. Aug. 20–Sept.

This is the common goldenrod of the "*canadensis*" group on the clay soils such as the heavier clay-alluviums and clay-gravels of the basin.

W. Mass. and n. w. Conn., to N. Y.

16. **S. ohioensis** Riddell.

Boggy meadows, in marl; rare. Aug. 20–Sept. 20.

Marshes about Newton Ponds (*D.*!), Lowery Ponds (*D.*!), and Vandemark Pond (*A. J. E. & L. H. MacDaniels*). [Occurring also in Bergen Swamp and near Rochester; rare in N. Y. State.]

Ont. and w. N. Y., to Ind. and Wis.

17. **S. graminifolia** (L.) Salisb. (*S. lanceolata* of Cayuga Fl.)

Dry or moist sandy fields and roadsides, apparently in the more acid soils; scarce. Aug.–Sept.

Apparently confined to the hilly region s. and s. e. of Ithaca: shore of Spencer Lake; top of hill, North Spencer; Caroline Center; hillside, Brookton; s. of Dryden Lake; roadside, in sandy soil, Dryden.

E. Que. to Sask., southw. to N. J., Ill., and Mo., and in the mts. to N. C.; frequent on the Coastal Plain.

17a. **S. graminifolia** (L.) Salisb., var. **Nuttallii** (Greene) Fernald.

Fields, fence rows, and roadsides, in dry or poorly drained, sterile, gravelly or rarely heavy, soils, with no apparent relation to lime content; common, and generally distributed. Aug.–Sept.

Newf. to Mich., southw. to Ala.; common along the coast.

This species has greatly increased in abundance in recent years.

5. **Bellis** (Tourn.) L.

1. **B. perennis** L. ENGLISH DAISY.

"Spontaneous on Mr. Lord's lawn several years" (*D.*); in the lawn by Sage College, 1912–1920.

Native of Eu.

6. Aster (Tourn.) L.

a. Leaves, at least the lower ones, cordate, petioled.
b. *Heads corymbose; involucral bracts, at least the outer ones, obtuse.*
c. Involucre and pedicels pubescent but not glandular; rays white.
d. Leaves thin, sharply toothed; involucre 4–6 mm. long. 1. *A. divaricatus*
d. Leaves thicker, shallowly toothed; involucre 7–9 mm. long. 2. *A. Schreberi*
c. Involucre and pedicels minutely glandular-pubescent; rays lavender, frequently white. 3. *A. macrophyllus*
b. Heads paniculate; involucral bracts narrower, acute.
c. Leaves glabrous or sparingly villous, often rough.
d. Branches of the panicle strongly ascending; rays white; lower leaves ovate-lanceolate. 4. *A. sagittifolius*
d. Branches of the panicle more spreading; rays normally blue or lavender; leaves ovate.
e. Leaves thin, veiny, slightly scabrous above, prominently toothed, slightly or not at all wing-petioled. 5. *A. cordifolius*
e. Leaves thicker, waxy, very smooth, less prominently toothed, mostly wing-petioled, the upper ones more often sessile and more often tapering at the base. 6. *A. Lowrieanus*
c. Leaves velvety beneath, the upper ones broadly clasping, the lower ones with wing-margined, dilated petioles, slightly toothed; rays blue or lavender. 7. *A. undulatus*
a. Leaves all sessile or tapering to a petiole-like base.
b. Leaves clasping by a cordate base.
c. Plant glandular-pubescent; foliage fragrant when fresh; rays purple or rose. 8. *A. novae-angliae*
c. Plant not glandular; rays normally blue or violet.
d. Leaves not contracted below the middle and again dilated at base, serrate or entire; plants 6–25 dm. high, more or less strict.
e. Leaves waxy, very smooth and glaucous; stem smooth and glaucous; the green tips of the involucral bracts rhomboidal; rays bluish lavender. 9. *A. laevis*
e. Leaves not waxy nor glaucous; the green tips of the involucral bracts narrow-linear; rays blue.
f. Internodes 10–60 mm. long, coarsely hairy over the whole surface, rarely glabrous; leaves dull, scabrous above, more or less serrate; panicle lax, coarsely hairy, rarely subvillous; heads with violet-blue rays and about 50 disk flowers; involucral bracts more spreading than in no. 11, and the tips more twisted and recurved; hairy part of style branches equaling the glabrous part. 10. *A. puniceus*
f. Internodes, except the lowest, 5–13 mm. long, glabrous or somewhat villous on the angles; leaves thicker, usually somewhat glossy, smooth except for the scabrous subentire margin, rarely sparingly scabrous above; panicle densely villous; heads with pale lilac rays and about 35 disk flowers; involucral bracts subappressed or spreading, rather straight; hairy part of style branches shorter than the glabrous part. 11. *A. lucidulus*
d. Leaves contracted below the middle and again dilated at base, strongly serrate; plants about 7 dm. high, diffuse. 12. *A. prenanthoides*
b. Leaves all without a cordate-clasping base.
c. Bracts of the involucre with green tips, the green midrib dilated toward the apex.
d. Heads large, the involucre more than 5 mm. high; rays normally lavender or blue; leaves linear. 13. *A. junceus*

d. Heads smaller, the involucre 5 mm. high or less; rays white or sometimes tinged with blue.

e. Uppermost leaves and involucral bracts subulate, with rather thick pungent tips; foliage leaves linear. 14. *A. ericoides*

e. Uppermost leaves and involucral bracts without thick subulate tips; foliage leaves various.

f. Corollas of the disk flowers goblet-shaped; lobes of the corolla equaling or exceeding the throat in length, those of the outer florets, at least. generally recurved; rays 7–14. 15. *A. lateriflorus*

f. Corollas of the disk flowers tubular-funnel-form; lobes of the corolla shorter than the throat, erect or merely spreading; rays 14–50. 16. *A. paniculatus*

c. Bracts of the involucre without green tips, the green or greenish midrib not dilated toward the apex; rays white or nearly so.

d. Plant tall, stiff, very leafy, with many closely corymbose heads; involucre 3–5 mm. long; pappus double. 17. *A. umbellatus*

d. Plant low, zigzag, with scattered leaves and few loosely panicled or corymbose heads; involucre 6–13 mm. long; pappus simple. 18. *A. acuminatus*

1. **A. divaricatus** L. (*A. corymbosus* of Cayuga Fl.)

Dry woodlands and banks, except in the heavier soils; common. July 20–Sept. 15.
S. Me. and w. Que. to Man., southw. to Ga. and Tenn.; less abundant on the Coastal Plain.
Nearly all the plants are of the form termed by Burgess *A. tenebrosus.* Many species belonging to this group of Asters have been described by Burgess, but this and the two following are the only ones recognizable as species in this region.

2. **A. Schreberi** Nees.

Borders of dry woods, chiefly in clay; frequent. July 15–Sept., flowering earlier than other species.
Dry Run, Spencer; North Spencer; Six Mile Creek; Cascadilla Creek, toward Dwyer Pond; woods e. of C. U. barns; Fall Creek, s. of Beebe Lake; near Republic Inn and n. of railroad station, Freeville; Paine Creek; and elsewhere.
N. E. to Mich., southw. to Va.; rare or absent on the Coastal Plain.
Having the appearance of a hybrid between *A. divaricatus* and *A. macrophyllus,* which may be its true status.

3. **A. macrophyllus** L.

Woodlands and banks where not too dry, mostly in gravelly or sandy noncalcareous loams; common. Aug.–Sept. 20.
Most abundant about woods of oak and chestnut on the more residual soils of the higher hills of the basin, and on the shore of Cayuga Lake; rare in the McLean region and on the clays and the richer heavier soils.
N. B. to Minn., southw. to N. C. In the Cayuga Lake Basin the species is found chiefly on the lighter soils, but it occurs only occasionally on the Coastal Plain.

4. **A. sagittifolius** Wed.

Dry fields and thickets, in clay, stony clay, or clay loams; locally common. Sept.–Nov.
Local at mouth of Enfield Glen, and on South Hill s. of Coddington Road; abundant *along the e. side of the lake from Cayuga Heights to Union Springs* (*D.*!); n. of Newton Ponds.
N. B. (?) and Vt. *to* N. Dak., southw. to Fla., Miss., and Okla.; *rare or absent* on the Coastal Plain.

5. A. cordifolius L.

Dry fields, roadsides, thickets, and the borders of woods, in light noncalcareous soils, rarely in clay gravels or in pure clay; common. Sept.–Oct.

E. Que. to Iowa, southw. to Ga. and Mo., including the Coastal Plain.

6. **A. Lowrieanus** Porter.

In situations similar to the preceding; frequent. Aug. 15 Sept.

Dry Run, Spencer; top of North Spencer Hill; Cascadilla Glen; Beebe Lake; Renwick slope; Chickaree Woods, formerly; Ringwood.

Conn. to Ont., southw. to N. C.; rare on the Coastal Plain.

Plants with the leaves broader and more incised than in the typical form occur on the Renwick slope. They are occasional only, and do not agree exactly with var. *incisus* Porter. *A. Lowrieanus* and its variety have the appearance of hybrids between *A. cordifolius* and *A. laevis*, which quite possibly is their true status.

7. A. undulatus L.

Dry fields and thickets, in sandy or gravelly sterile noncalcareous soils; common. Sept.–Oct.

On the more residual acid soils of the higher hills of the basin, along the shores of Cayuga Lake, on ravine crests, and in the sandy country n. of the lake; rare or absent in the McLean region and on the clays and richer soils back from the lake shores.

N. B. and N. S. to Minn., southw. to Fla., Ala., La., and Ark.; common on the Coastal Plain.

8. A. novae-angliae L. NEW ENGLAND ASTER.

Damp fields, thickets, and roadsides, in the heavier soils, especially in clays, alluviums, and clay-gravels; common. Sept. 10–Oct. 10.

Scarce on the more residual soils of the higher hills of the basin, and on the ravine crests and cliff crests along Cayuga Lake.

Que. (?) and Me to Sask., southw. to S. C., Ala., Ark., Kans., and Colo.; infrequent or rare on the Coastal Plain.

Gray's *Manual* credits this species to "chiefly calcareous grounds." A form with rose-colored rays (forma *roseus* (Desf.) Britton, see Proc. Nat. Sci. Acad. Staten Island 2, Nov., 1890) is frequent. A form with light blue flowers occurs at Union Springs (*D.*), s. of Levanna (*D.*), and "near Osmun's Sta." (*D.*).

9. A. laevis L.

Dry banks, fields, and thickets, in sandy or gravelly noncalcareous soils; common. Sept.–Nov.

Rare or absent in the McLean region and on the clays and richer soils of the basin.

Me. to Sask., southw. to Va., Ala., La., Mo., and Colo.; infrequent on the Coastal Plain.

A probable hybrid of this species with *A. undulatus* was found on Thatcher Pinnacles. The species is variable in width of leaf, the form with broadest leaves answering to var. *amplifolius* Porter.

10. A. puniceus L.

In marshes, swamps, and springy fields along streams, in rich black soils; common. Sept.–Oct.

Newf. to Man., southw. to Ga., Tenn., Ohio, and Mich., including the Coastal Plain. A plant primarily of the Appalachian wooded region.

Hybrids of this with other species are not infrequent. Individuals with pinkish flowers are occasional. The identity of Dudley's no. 467 has not been determined.

11. **A. lucidulus** (Gray) Wiegand. (See Rhodora 26: 4. 1924. *A. puniceus*, var. *lucidulus* Gray.)

Marly springy places; rare. Sept.

Near Ludlowville, 1885 (collector unknown); moor of Lowery Ponds (*L. F. Randolph, A. J. E., & K. M. W.*).

N. E. to Wis. and Ill.

This plant is sufficiently distinct from *A. puniceus* in the characters given in the key to warrant its treatment as a species. In appearance it is quite unlike *A. puniceus*. Dudley's *A. puniceus*, var. *laevicaulis*, may be in part this species. Dudley's specimens in the Gray Herbarium from the two stations cited by him for this variety, Ludlowville and Montezuma, are both typical *A. puniceus* as here interpreted. However, a specimen in the C. U. Herbarium labeled "*Aster puniceus lucidulus* Gray near Ludlowville, Oct. 2, 1885," but without the collector's name, is of the present species. It was probably collected by Dudley.

12. **A. prenanthoides** Muhl.

Damp roadsides, banks, and stream gravels, in calcareous regions, rarely in clays; common. Sept.–Oct.

Especially abundant in the McLean region; rare or absent in the more sterile acid sandy soils of the basin.

W. N. E. to Minn., southw. to Va., Ky., and Iowa; rare or absent on the Coastal Plain.

[**A. novi-belgii** L.

Doubtfully credited by Dudley to Fleming Meadow; probably an error. This is chiefly a plant of the Atlantic Coastal Plain.]

13. **A. junceus** Ait.

Calcareous bogs and meadows; scarce. July 10–Sept. 15.

Cayuta Lake (*D.*); Fleming Meadow (*D.*); sedgy moor of Mud Pond, McLean Bogs (*D.*!); near Cortland marl ponds (*D.*); Spring Lake; Westbury Bog.

E. Que. to B. C., southw. to n. N. E., n. Pa., Ohio, Wis., and Nebr.; rare or absent on the Atlantic Coastal Plain.

Variable in width of leaf and size of inflorescence.

14. **A. ericoides** L.

Sandy or gravelly fields or roadsides, or rarely in heavy clay; occasional. Sept.–Oct. 15.

Spencer Lake; e. of Slaterville; hillside s. of Brookton; edge of South Hill Marsh; clay pasture s. side of Coddington Road; roadside, E. State St., Ithaca; near upper dam in Six Mile Creek; Cayuga Heights; Cornell Heights; Turkey Hill; Salmon Creek; and elsewhere. Rare when Dudley's *Cayuga Flora* was published, now apparently becoming frequent.

Me. to Minn., southw. to Fla.; frequent or common along the coast.

[**A. vimineus** Lam.

"Low grounds and woods as Casc. Cr. Fall Cr. and Freeville; frequent" (*D.*). No specimens answering to this species have been seen by the authors. Specimens collected in late years from the localities cited by Dudley for *A. vimineus* are narrow-leaved *A. lateriflorus*. Dudley's citations are probably to be thus explained. *A. vimineus* is chiefly a Coastal Plain species.]

15. **A. lateriflorus** (L.) Britton. (*A. diffusus*, its var. *hirsuticaulis*, and possibly also its var. *thyrsoideus*, of Cayuga Fl.)

Damp scrubby fields and thickets, and in swamps, in neutral or even marly soils; common. Aug.–Sept.

Que. and N. S. to Wis., southw. to Fla. and Tex., including the Coastal Plain.
The local material has only slightly hairy stems. Three forms occur: (1) with the subsessile heads densely arranged, rare (probably typical *A. lateriflorus*); (2) with the heads more loosely arranged, the more common form (probably *A. diffusus* Ait.); (3) with the involucral bracts more dilated at the tips and the more conspicuous reduced leaves on the peduncles firmer and more obtuse, occasional (possibly *A. horizontalis* Desf.). Plants of the last-named form from the Cayuga Lake Basin are not extreme, and are intermediate between the other forms and no. 3 as found along the coast. Bog plants of form no. 2 often have narrower, nearly linear, leaves. Dudley's *A. diffusus*, var. *thyrsoideus*, cannot be identified with certainty.

16. **A. paniculatus** Lam. (*A. Tradescanti* and *A. paniculatus* of Cayuga Fl.) WHITE FIELD ASTER.

Damp or rather dry roadsides and thickets; common, especially in heavy soil. Sept.–Oct.
Que. to Mont., southw. to Va., La., and Mo.; infrequent on the Coastal Plain.
Exceedingly variable as to habit, density of inflorescence, size of heads, length of rays, and size and shape of leaves. An attempt has been made to separate the smaller-headed forms, as *A. Tradescanti*, from those with larger heads (*A. paniculatus*), but the intermediates are as numerous as, if not more numerous than, the extremes. So far, it has not been possible to draw any lines in the local material between the multitude of forms of this species, or to find any factors with which the forms are connected. It has seemed best to employ the name *A. paniculatus* for the local plants, as the exact status of *A. Tradescanti* is in doubt; the latter species may still be distinct elsewhere, and possibly based on other characters.

17. **A. umbellatus** Mill.

Edge of woods and thickets, in low mucky soils, rarely on wet rocks and talus; common. Aug. 10–Sept. 15.
Newf. to Sask., southw. to Ga., Mich., and Iowa, including the Coastal Plain.

18. **A. acuminatus** Michx.

Dry or damp woodlands in humus; frequent at the higher elevations. Aug.–Sept. Spencer; Danby (*D.*!); Newfield (*D.*!); upper Coy Glen; Six Mile Creek (*D.*); Caroline (*D.*); Ringwood; Dryden Lake; McLean region; Junius. Especially abundant in tracts recently cleared.
Lab. to Ont., southw. to Pa. and in the mts. to Ga.; rare or absent on the Coastal Plain.

7. **Erigeron** L.

a. Rays much exceeding the disk, conspicuous; heads of medium size or large.
  b. Heads 2.5–3.5 cm. in diam.; rays 1 mm. wide, blue; leaves oblong-lanceolate. 1. *E. pulchellus*
  b. Heads 1.5–2 cm. in diam.; rays 0.8 mm. wide or less.
    c. Rays 100–150, pink; cauline leaves oblong, clasping. 2. *E. philadelphicus*
    c. Rays 50–75, white; cauline leaves lanceolate to linear, narrowed and not clasping at base.
      d. Leaves toothed or entire, firm; pubescence strigose. 3. *E. ramosus*
      d. Leaves coarsely toothed, thin; pubescence, if any, scattered and hispid. 4. *E. annuus*
a. Rays scarcely exceeding the disk, inconspicuous; heads very small and numerous, in a thyrsoid panicle. 5. *E. canadensis*

1. **E. pulchellus** *Michx.* (*E. bellidifolius* of Cayuga Fl.) ROBIN'S PLANTAIN.

Rather dry grassy banks, in not too sterile, gravelly or sandy, somewhat acid or moderately calcareous, soils; frequent, and generally distributed. May 15–June 25.

S. Me. to Minn., southw. to Fla., La., and Kans., including the Coastal Plain.

2. **E. philadelphicus** L. FLEABANE.

Moist grassy banks and fields and on wet ravine cliffs, in more or less calcareous soils; common, and generally distributed except in the acid soils. June; often Oct. in the ravines.

Lab. to B. C., southw. to Fla. and Calif.; mostly absent from the Atlantic Coastal Plain and from granitic N. E.

3. **E. ramosus** (Walt.) BSP. (*E. strigosus* of Cayuga Fl.) DAISY FLEABANE.

A weed in dry or wet grassy fields and waste places, in various soils; common, and generally distributed. June–Sept.

Newf. to B. C., southw. to Fla., La., Tex., and Calif.; common in N. E. and on the Atlantic Coastal Plain.

4. **E. annuus** (*L.*) *Pers.* *DAISY FLEABANE.*

A weed in situations similar to the preceding, but in somewhat richer soils; common, and generally distributed. July–Sept.

N. S. to Man., southw. to Ga., Ky., and Mo.; general in N. E. and on the Coastal Plain.

5. **E. canadensis** L. HORSEWEED.

A weed in situations similar to the preceding, but in somewhat richer soils; common, and generally distributed. Aug.–Oct.

Throughout N. A., except in the extreme North. Found also in other countries.

8. Sericocarpus Nees

1. **S. asteroides** (L.) BSP. (*S. conyzoides* of Cayuga Fl.) WHITE-TOPPED ASTER.

Dry open woodlands and scrubby banks, in sandy or gravelly acid soils; frequent. July 10–Aug.

On the high hills w., s., and e. of Ithaca, along the ravine crests and lake cliffs, and in the sandy soil n. of Cayuga Lake: South Hill; Coy Glen; Cascadilla Glen; Fall Creek; Shurger Glen; Taughannock Gorge; and elsewhere. Rare or absent in the McLean region and on the clays and richer soils back from the lake shore.

S. Me. to Ont., southw. to Ala., Ky., and Ohio, including the Coastal Plain.

9. Antennaria Gaertn.[36]

a. Rosette leaves comparatively small, 0.2–2.1 cm. wide, with only the midrib prominent to the tip beneath; the lateral ribs short or wanting.

b. Middle and upper cauline leaves terminated by a flat or a merely involute scarious appendage; rosette leaves oblanceolate to spatulate-oblanceolate or narrowly obovate, subacute, rarely rounded, 1-nerved beneath; (corollas 4.3–6.2 mm. long, pappus hairs 6–9 mm. long, achenes 1.2–1.5 mm. long).

c. Stolons (when well developed) more or less flagelliform, creeping, with much reduced leaves, the apical leaves later enlarging; basal leaves, especially those of the stolons, dull and more or less hairy above; pistillate inflorescence of 1–8 subracemose heads; involucral bracts purplish brown or reddish brown, with white tips; styles usually crimson; staminate plants common, the *involucral bracts with expanded petaloid erose tips, and the pappus hairs at* the summit slightly dilated, undulate or entire. 1. *A. neglecta*

[36] Characters furnished by M. L. Fernald. Key constructed by the authors.

c. Stolons (except in shaded individuals) comparatively short and assurgent, *more leafy, usually forming dense mats; basal leaves, especially those of the* stolons, bright green and glabrous above; pistillate inflorescence of 3–18 *corymbose heads; involucral bracts greenish white, often greenish* brown, with subscarious, rather narrow, tips; styles usually white or cream color; *staminate plants* rare, the *involucral bracts* with expanded thin petaloid erose tips, and the pappus hairs at the summit somewhat dilated, strongly barbellate throughout. 2. *A. canadensis*

b. Middle and upper cauline leaves subulate-tipped or mucronate, without a scarious appendage (except sometimes on the bracteal leaves of the inflorescence); rosette leaves spatulate or spatulate-obovate, rarely oblanceolate, rounded at apex, rarely acute, often 3-nerved beneath toward base, dull and more or less hairy, especially on the stolons; (pistillate heads corymbose or glomerate, styles not purple).

c. Stolons rather long, prostrate, leafy with an assurgent tuft of larger leaves at apex; leaves with a rather narrow subpetiolate base, scarcely mucronate; *involucre 7–11 mm. high; bracts petaloid, linear-oblong, the outer ones rather* blunt; corollas 5–6.5 mm. long; the longer pappus hairs 5.5–7.5 mm. long; achenes 1.2–1.7 mm. long; staminate plants very rare, with tips of the involucral bracts very broadly dilated, firm, petaloid, scarcely erose, and the pappus hairs much dilated, barbellate to the tip.

d. Rosette leaves spatulate or spatulate-obovate, rounded at apex. 3. *A. petaloidea*

d. Rosette leaves oblanceolate, acute or acutish. 3a. *A. petaloidea*, var. *noveboracensis*

c. Stolons short, immediately assurgent with a terminal tuft of large leaves at apex; leaves more cuneate, with broader bases, plainly mucronate; involucre 6–7 mm. high; bracts petaloid or scarious; corollas 3.7–5 mm. long; the longer pappus hairs 5.5–6 mm. long; achenes 1.1–1.4 mm. long; staminate plants very rare, the involucral bracts with very broad and blunt petaloid erose tips, those in the variety somewhat narrower, and the pappus hairs scarcely dilated, strongly barbellate throughout.

d. Tips of the involucral bracts linear-oblong, mostly obtuse, petaloid. 4. *A. neodioica*

d. Tips of the involucral bracts tapering, acute, usually thinner and more scarious. 4a. *A. neodioica*, var. *attenuata*

a. Rosette leaves comparatively large, 0.7–5.5 cm. wide, with 3–7 somewhat prominent long ribs beneath; middle and upper cauline leaves with firm subulate tips.

b. Rosette leaves, at least those of the stolons, dull, hairy above.

c. Pistillate involucre 5–7 mm. high; basal leaves obovate to roundish-oblong-ovate or more rarely oblanceolate, minutely mucronate; pistillate plants with slender stems and 5–12 linear-lanceolate, attenuate, more or less distant, leaves; involucral bracts often purplish-tinged, with narrow scarious or petaloid tips; corollas often crimson, 2.5–4.3 mm. long; longest pappus hairs 4–5.5 *mm. long; mature achenes 1.1–1.5 mm. long; staminate plants* common, the tips of the involucral bracts more or less dilated and erose, and the pappus hairs moderately dilated, barbellate throughout. 5. *A. plantaginifolia*

c. Pistillate involucre usually 8–11 mm. high; basal leaves more strongly mucronate; pistillate plants with corollas 5–7 mm. long; longest pappus hairs 6–9 mm. long; flowering stems stout, with larger, wider, more overlapping leaves.

d. Rosette leaves spatulate to narrowly spatulate-obovate, with rounded apex; pistillate plants with 6–15 cauline leaves; outer involucral bracts with

blunt erose petaloid tips; corollas 5.5–7 mm. long; longest pappus hairs 8–9 mm. long; achenes 1.5–1.8 mm. long; staminate plants very rare, the tips of the involucral bracts very broad, firm, petaloid, scarcely erose, the pappus hairs dilated at the summit, and there merely undulate or entire. 6. *A. occidentalis*

d. Rosette leaves somewhat rhombic-obovate, with rounded apex; pistillate plants with 8–20 cauline leaves; outer involucral bracts with narrowly oblong blunt petaloid or more attenuate scarious tips; corollas 5–6 mm. long; longest pappus hairs 6–8 mm. long; mature achenes 1.3–1.6 mm. long; staminate plants frequent, the involucral bracts with broad, firm, petaloid, obscurely erose tips, and the pappus hairs moderately or not at all dilated, barbellate to the tip. 7. *A. fallax*

b. Rosette leaves, especially those of the stolons, bright green and glabrous above, or at most with a few evanescent arachnoid hairs, and in size and outline resembling those of no. 7; bracts of the pistillate heads attenuate, subscarious; corollas 5–6.3 mm. long; longest pappus hairs 7.5–8.5 mm. long; achenes 1.6–2.2 mm. long; staminate plants rather rare, the involucral bracts broadly dilated, erose or subentire, and the pappus hairs more or less dilated, barbellate to the tip. 8. *A. Parlinii*

1. **A. neglecta** Greene. LADIES' TOBACCO. PUSSY'S TOES.

Damp or rather dry gravelly pasture-lands and fields usually deficient in lime; locally frequent. May 6–30.

Frequent in the valleys s. w., s., and e. of Ithaca, along the lake cliffs, and n. of the lake; also in the McLean region. Staminate plants frequent or common.

Me. to N. Y., Ill., and Nebr., southw. to D. C., Ind., Mo., and Kans., including the Coastal Plain.

2. **A. canadensis** Greene. LADIES' TOBACCO. PUSSY'S TOES.

Damp or more often dry gravelly or stony fields, pastures, and wood borders, in soil usually deficient in lime; generally common. May 8–30, mostly May 10–25.

Common on the hills s. w., s., and e. of Ithaca, in the McLean region, along the lake cliffs, and on the Ontario plain. Staminate plants not reported.

Que., N. S., and Me., to Man., southw. to Conn., N. Y., Ont., Mich., and Wyo., and in the mts. to Va.; infrequent or rare on the Coastal Plain.

3. **A. petaloidea** Fernald. LADIES' TOBACCO. PUSSY'S TOES.

Damp or dry gravelly pastures and fields and in ravines, in the more calcareous regions; generally common. May 15–23, more rarely May 9–30.

Common in the hills s. w. and s. of Ithaca, along the e. shore of Cayuga Lake, on the Ontario plain, and especially eastw. to the McLean region. Staminate plants not reported.

Que. and Me. to Wis., southw. to Mass., n. Pa., Ont., and Mich.; rare or absent on the Coastal Plain.

3a. **A. petaloidea** Fernald, var. **noveboracensis** Fernald. (See Rhodora **23**: 296. 1921.)

In soils similar to the preceding, or possibly more sterile.

Frequent in the hills s. w., s., and e. of Ithaca, and in the McLean region. Staminate plants not known.

Cayuga Lake Basin, and near Rochester, N. Y.

4. **A. neodioica** Greene. LADIES' TOBACCO. PUSSY'S TOES.

Dry gravelly or stony sterile pastures and fields, in noncalcareous soils; frequent. May 15–25.

Frequent in the hills s. w., s., and e. of Ithaca, in the McLean region, along the e. shore of Cayuga Lake, and on Howland Island. Staminate plants not reported.
Newf. and N. S. to Wis., southw. to D. C., Va., Ont., and Mich.; common on the Coastal Plain.

4a. **A. neodioica** Greene, var. **attenuata** Fernald. (See Proc. Boston Soc. Nat. Hist. **28**: 245. 1898.)

In soils similar to the preceding; common. May 15–June 15.
Range practically the same as that of the typical form; more common eastw.

5. **A. plantaginifolia** (L.) Richards. LADIES' TOBACCO. PUSSY'S TOES.

Dry stony sterile pastures, fields, and ravine banks, especially in residual soils over sandstones; locally common. May 5–30, mostly May 5–20.
Common on the hilltops s. of Ithaca, about the ravines, and along the lake cliffs. Staminate plants common.
Me. to Minn., southw. to Va., Tenn., Mo., and in the mts. to Ga.; common on the Coastal Plain.

6. **A. occidentalis** Greene.

Dry stony pastures in the vicinity of clay and residual sandstone soils; rare. May 15–June 10.
N. e. slope of South Hill, 1919; sandy hills e. of Newton Ponds, 1922. Staminate plants not reported.
Me. to Minn., southw. to Pa. and Ill.; rare or absent on the Coastal Plain.

7. **A. fallax** Greene. LADIES' TOBACCO. PUSSY'S TOES.

Dry gravelly fields, mostly in glacial till; common.
Two forms occur:
(*a*) Involucral bracts attenuate, scarious, the involucre rarely purple-tinged (typical *A. fallax* Greene). May 15–June 10.
Occasional about Ithaca, and more frequent along the e. shore of Cayuga Lake: *Bull Hill, Newfield; upper Buttermilk Glen; Six Mile Creek; Cascadilla Creek; Esty* Glen; Wood Mill; Aurora; Scipioville; Duck Lake. Staminate plants reported.
(*b*) Involucral bracts broader, more petaloid, and less attenuate, the involucre generally purple-tinged (*A. arnoglossa* Greene, var. *ambigens* Greene, see Pittonia **3**: 320, 1898). May 10–30.
Distributed throughout the basin except possibly on the Ontario plain, from which there are no records. More common than the preceding form. Staminate plants occasional.
Que. to Wis. and Kans., southw. to Va., Ind., Miss., Tex., and in the mts. to Ga.; less frequent on the Coastal Plain.

8. **A. Parlinii** *Fernald*.

Damp or dry stony residual soils over sandstone; rare. May 15–25.
Sandy bank near swamp s. of Key Hill; around Slaterville Swamp; about South Hill Marsh and terrace n. Staminate plants not reported.
N. S. to Ont., Ill., and Iowa, southw. to Va., N. Y., Ohio, Ill., and in the mts. to Ga.; *rare on the Coastal Plain.*

10. Anaphalis DC.

1. **A. margaritacea** (L.) B. & H. PEARLY EVERLASTING.

Dry pastures and borders of woods, especially in gravelly, slightly calcareous, soils; common. Aug.–Sept.

In the Cayuga Lake Basin, most abundant in the McLean region.

Newf. to Alaska, southw. to Pa., Kans., and Oreg., including the Atlantic Coastal Plain. Found also in Asia.

Plants approaching var. *occidentalis* Greene in the more glabrous foliage and the larger upper leaves, have been found southeast of Etna (*A. Gershoy*) and on Turkey Hill. A form with the leaves green above but narrow (forma *anochlora* Fernald, Rhodora **24**: 205, 1922) is occasional.

11. Gnaphalium L.

a. Plants tall, erect, with a more or less balsamic odor; heads about 5 mm. high.
b. Leaves tapering to a sessile base; plant slightly glandular. 1. *G. obtusifolium*
b. Leaves clasping at base, decurrent; plant strongly glandular-viscid. 2. *G. decurrens*
a. Plants low, diffuse, scarcely fragrant; heads about 2 mm. high. 3. *G. uliginosum*

1. **G. obtusifolium** L. (See Rhodora **20**: 71. 1918. *G. polycephalum* of Gray's Man., ed. 7, and of Cayuga Fl.) EVERLASTING.

Dry gravelly or sandy fields and roadsides, in neutral or acid soils; infrequent. Aug. 15–Sept.

N. e. of Spencer Lake; West Danby, on the Pinnacles (*D.*); Enfield Glen (*D.*); Coy Glen; Cascadilla woods (*D.*); Fall Creek (*D.*); Cornell Heights; near Woodwardia Bog; near Beaver Brook; near Ludlowville; s. of Benson Corners; Junius; and elsewhere.

N. S. to Man., southw. to Fla., Kans., and Tex.; common along the coast.

2. **G. decurrens** Ives. EVERLASTING.

In situations similar to the preceding, but absent on acid soils; common. Aug.–Sept.

Rare on the chestnut soils of the southern hills of the basin, on the ravine crests, and on the sands at Junius; most abundant in the McLean region.

E. Que. to B. C., southw. to Pa., Ohio, Mich., Minn., and in the mts. to Ariz.; rare or absent on the Atlantic Coastal Plain.

3. **G. uliginosum** L. LOW CUDWEED.

Dried-out mud in ditches, by roadsides, and along shores; common, and generally distributed. July–Sept.

Newf. to Sask., B. C., and Oreg., southw. to Va. and the Great Lakes region, including the Atlantic Coastal Plain. Found also in Eu.

12. Inula L.

a. Leaves tomentose beneath, large, ovate; plant 8–20 dm. high. 1. *I. Helenium*
a. Leaves glabrous or nearly so beneath, small, narrowly oblong; plant 2–10 dm. high. [*I. salicina*]

1. **I. HELENIUM** L. ELECAMPANE.

Low places and gravelly pastures along streams, usually in calcareous soils; frequent. July–Aug.

Spencer Lake; upper Buttermilk Glen; upper reservoir, Six Mile Creek; Cascadilla Creek, above Dwyer Dam; Cayuga Heights; McLean; Cortland marl ponds; and elsewhere; absent on the sandy acid soils w., s., and e. of Ithaca and n. of Cayuga Lake, and also on the clays and heavy soils of the basin.

N. S. to Minn., southw. to N. C. and Mo.; infrequent on the Coastal Plain. Naturalized from Eurasia.

[I. SALICINA L.

Wooded bank at South Ave. bridge, Cascadilla Creek, Ithaca, 1925 (*Mrs. M. W. Allen*). Native of Eu.]

13. Polymnia L.

a. Rays 12–25 mm. long, yellow; leaves palmately veined and lobed; achenes striate; plants not glandular. 1. *P. uvedalia*

a. Rays 10 mm. long or less, whitish; leaves pinnately lobed; achenes 3-ribbed; plants glandular. 2. *P. canadensis*

1. **P. uvedalia** L. LEAFCUP.

Rich low woodlands and banks; rare. Aug.

"*Salmon Cr. ravine, below the spring*" (*D.*); "*Big Gully, above the Falls*" (*D.!*).

N. Y. to Ind., southw. to Fla., Mo., and Tex.; rare or absent on the Coastal Plain A plant of the rich soils of the Ohio and Mississippi Valleys.

2. **P. canadensis** L. LEAFCUP.

Wooded slopes and bottom-lands, in limy regions; scarce. Aug.

Slope of North Pinnacle, Caroline (*D.!*); Enfield Glen; Negundo Woods (*D.*); lower Six Mile Creek; ravine of Ferris Brook (*D.!*); ravine near Elm Beach, Romulus; Paine Creek; Grove Creek; cedar swamp in Tyre (*D.*).

W. Vt. to Minn., southw. to N. C., Tenn., and Ark.; rare or absent on the Coastal Plain. A plant primarily of the Mississippi Valley.

[Parthenium L.]

[P. HYSTEROPHORUS L.

Several plants of this species were found growing on the city garbage dump along the lighthouse road, Ithaca, in 1921. Native of tropical Am.]

14. Ambrosia (Tourn.) L.

a. Leaves large, 3-lobed; plant 1–6 m. high; receptacle of staminate heads naked. 1. *A. trifida*

a. Leaves 1–2-pinnatifid; plant 0.3–2.5 m. high; receptacle of staminate heads chaffy.

b. Leaves 2-pinnatifid, thin; fruit with about 6 tubercles. 2. *A. artemisiifolia*

b. Leaves 1-pinnatifid, thick; fruit almost without tubercles. [*A. psilostachya*]

1. **A. trifida** L. GREAT RAGWEED.

Rich alluvial soils about streams and marshes; locally common. July 15–Aug.

In the Cayuga Lake Basin, confined to the Cayuga Lake marshes and the inlet region.

Que. to Man., southw. to Fla., Nebr., Colo., and N. Mex.; occurring sparingly along the coast.

2. **A. artemisiifolia** L. (Including *A. elatior* L.) COMMON RAGWEED.

Dry fields, roadsides, and waste places, in various soils; very common. Aug. 15–Sept. 15.

N. S. to B. C., southw. to Fla. and Mex., including the Atlantic Coastal Plain. The native range is now obscure, but the species was probably not indigenous east of the Allegheny Mts.

This plant is believed to be the principal cause of autumnal hay fever. The pollens of this and other species of Ambrosia, as well as that of Iva, are equally virulent.

[**A.** PSILOSTACHYA DC.

In sod, L. V. R. R. yards near Barge Canal Terminal, 1925 (*W. C. Muenscher*), doubtfully established. Native of w. U. S.]

15. Xanthium (Tourn.) L.[37 38]

1. **X. orientale** L. COCKLE-BUR. CLOTBUR.

Damp sandy or gravelly banks and shores; frequent. Aug.–Sept.

Widely distributed in N. A. except in the colder parts of Canada. Found also in Eu. and Cent. Am., and perhaps in other countries.

The following forms are found in the Cayuga Lake Basin: (1) Burs glabrous or minutely puberulent and atomiferous, fusiform, averaging somewhat smaller than in the other forms (*X. chinense* Mill., *X. pungens* Wallr., *X. glabratum* Britton, *X. americanum* Britton & Br., possibly Walt., *X. canadense* of Gray's Man., ed. 7, and of Cayuga Fl. (2) Burs more or less hispid, the body ellipsoidal with generally prominent beaks (*X. italicum* Mor., *X. pennsylvanicum* Wallr., *X. commune* Britton and of Gray's Man., ed. 7, *X. canadense*, var. *echinatum*, in part, of Cayuga Fl.). (3) Burs hispid, the body ovoid, broadly elliptic-ovoid, or oval, the beaks less prominent (*X. glanduliferum* Greene?, *X. canadense*, var. *echinatum*, in part, of Cayuga Fl., *X. echinatum*, in part, of Gray's Man., ed. 7). (4) Spines far apart and few in number, otherwise generally as in no. 2 (*X. Wootoni* Cockll.). The spines in this last-named form vary in number toward the normal, and the plants occur as individuals in otherwise normal colonies. In each of the above-named forms the spines vary greatly in shape and abundance.

16. Heliopsis Pers.

1. **H. helianthoides** (L.) Sweet. (*H. laevis* of Caynga Fl.)

Stream banks and open thickets, on alluvial bottom lands; common, and generally distributed. June 20–Aug.

N. Y. to Ont. and N. Dak., southw. to Fla., Tenn., and Ill.; rare or absent on the Coastal Plain. A plant of the rich soils of the Mississippi Valley.

Variable in the roughness of the foliage.

17. Rudbeckia L.

a. Disk dark purple or brown; stem rough-hairy, 1 m. high or less.
  b. Leaves, or some of them, 3-lobed or 3-divided; chaff awned, smooth; pappus a minute crown. 1. *R. triloba*
  b. Leaves, or some of them, coarsely toothed or incised; chaff acute, slightly ciliate or erose; pappus a short crown. 2. *R. speciosa*

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[37] Several years ago I undertook a revision of the American Xanthiums, making use of the material in the Gray Herbarium. After a prolonged but unsuccessful effort to prepare a satisfactory treatment, the problem was laid aside. I am now greatly in doubt as to the existence of more than one real species in the group represented by *X. chinense* Mill., *X. pennsylvanicum* Wallr., *X. italicum* Mor., and other related forms. The foliage in these forms is practically identical, and the only differences of any moment are in the burs, which are indeed highly variable. Extreme forms of burs, however, are often found in the same colony, as though sporadically produced. A large suite of specimens is almost sure to show a nearly or quite unbroken series through the various forms. In every attempt to segregate the burs into species, so many transitional specimens have been found as to do unwarranted violence to any species concept. It is probably wise to treat all North American Xanthiums as one species except *X. spinosum* L. and possibly *X. strumarium* L. and *X. echinatum* Murr. *X. strumarium*, however, is scarcely distinct, and with more study may also be included. *X. echinatum* may be a real species, as it has a distinct coastal range and seems to behave as though genetically distinct. Provisionally the oldest name, *X. orientale* L., is here taken for the group (when *X. strumarium* and *X. echinatum* are excluded). It has not seemed wise to assign varietal names within the species at present.—K. M. Wiegand.

[38] See revision by Millspaugh and Sherff, Field Mus. Nat. Hist. Pub. Bot. 4, no. 2. 1919.

b. Leaves entire or nearly so; chaff acutish, hirsute at apex; pappus wanting. 3. *R. hirta*

a. Disk dull greenish yellow; stem smooth, 1.5–3 m. high; leaves lobed or parted. 4. *R. laciniata*

1. **R.** TRILOBA L.

Waste places, locally abundant. June–Oct.

City dump, lighthouse road, Ithaca, 1924 (*W. C. Muenscher*). Spreading rapidly and now apparently established.

Native: N. J. to Minn., southw. to Ga., La., and Kans. Adventive northeastw.

2. **R. speciosa** Wen.

Alluvial thickets and gravelly stream banks; rare. July.

In the Cayuga Lake Basin, known only from Paine Creek, 1919 (*K. M. W., A. J. E., & L. F. Randolph*), where it is common through part of the ravine. Not reported elsewhere in N. Y. State.

N. Y. to Mo., southw. to Ga.; apparently absent on the Coastal Plain.

3. **R.** HIRTA L. BLACK-EYED SUSAN.

A weed in cultivated fields and along roadsides, in gravelly soil; frequent. July–Aug.

Hilltops, North Spencer; Caroline Pinnacles; Enfield Glen; Cayuga Heights; near Esty Glen; Asbury; and elsewhere; most abundant in the Freeville and McLean regions.

W. N. Y. to Man., southw. to Fla., Colo., and Tex. Introduced as a weed in the Eastern States.

4. **R. laciniata** L. CONE-FLOWER.

Borders of thickets, in rich low alluvial soils; frequent, and generally distributed. July 20–Sept. 10.

W. Me. to Man. and Idaho, southw. to Fla., Colo., and Ariz.; rare or absent on the Coastal Plain.

Three forms occur in the Cayuga Lake Basin: (a) leaves glabrous, the upper undivided leaves ovate; (b) leaves hairy, the upper undivided leaves ovate; (c) leaves glabrous, much divided, the upper leaves small, lanceolate, incised-divided, inconspicuous, disk corollas larger (5–5.2 mm. long), pappus deeper, achenes longer (4–5 mm. long), rays more pendent. The first two forms are common, the second one chiefly in the lake valley. The third form occurs only in the marl springs at Mud Creek, Freeville. It has been impossible to find names for these forms, and it is not possible to determine whether Linnaeus had in mind a hairy or a smooth plant.

18. Helianthus L.

a. Leaves sessile or nearly so, with a broad base. 1. *H. divaricatus*

a. Leaves tapering to an acute base or a petiole.

b. Leaves whitish beneath, very indistinctly toothed. 2. *H. strumosus*

b. Leaves green beneath, more plainly toothed.

c. Heads of medium size; disk 2 cm. in diam. or less; perennials.

d. Leaves thin, nearly or quite glabrous beneath; outer involucral bracts longer than the disk; rays about 10–12, light yellow; rootstocks creeping, not tuberous. 3. *H. decapetalus*

d. Leaves thicker, scabrous above, puberulent-canescent beneath; outer involucral bracts about equaling the disk, or shorter; rays 12–20, deep yellow; rootstocks short, tuberous-thickened at apex. 4. *H. tuberosus*

c. Heads large; disk 2.5 cm. in diam. or more; annuals. [*H. annuus*]

1. **H. divaricatus** L. WILD SUNFLOWER.

Dry open woods and thickets, in sandy or gravelly noncalcareous soils; common. Aug.–Sept.

On the more residual acid soils of the hills w., s., and s. e. of Ithaca, on the ravine crests and the crests of the cliffs along Cayuga Lake, and in the sandy regions n. of the lake; rare or absent in the McLean region and in the clays and richer soils back from the lake shores.

S. Me. to Man., southw. to Fla., La., and Nebr.; common along the coast.

Apparent hybrids with *H. strumosus* or *H. decapetalus* occur on Farley Point.

2. **H. strumosus** L. WILD SUNFLOWER.

In open woods or thickets, on damp or rather dry rich banks; frequent. Aug.–Sept. 20.

Cascadilla woods; Beebe Lake; King Ferry (*D.*); Lockwood Flats (*D.*); Union Springs; Junius; and elsewhere.

N. E. to Ont. and Minn., southw. to Ga., Tenn., and Ark., including the Coastal Plain.

"A stout, broad and hairy leaved form, south of Ithaca and near Cayuga Bridge" (*D.*) is possibly var. *mollis* T. & G.

3. **H. decapetalus** L. WILD SUNFLOWER.

Thickets on low alluvial soils or on the richer talus at the base of ravine cliffs, rarely in more exposed places; common, and generally distributed. July 25–Sept.

Me. and w. Que. to Minn., southw. to Ga., Tenn., and Mo.; rare or absent on *the Coastal Plain.*

4. H. TUBEROSUS L. JERUSALEM ARTICHOKE.

Roadsides, fence corners, and similar situations, in rich moist soil; frequent, and widely distributed. Sept.–Oct.

Adventive, or escaped from gardens, probably not native.

N. S. to Ont., southw. to Ga., Ark., and Kans.

Forms intermediate between this species and *H. decapetalus* are found along the lake shore, especially from Ledyard to Union Springs. These plants are very *possibly hybrids of the two species.* Dudley says, "the escaped hairy form, near Ithaca and Cayuga L. shore, on Lockwood's Flats and elsewhere." Some plants from a garden in Ithaca would seem to indicate that the cultivated form is really often hirsute.

[H. ANNUUS L. COMMON SUNFLOWER.

Commonly cultivated and occasionally springing up in waste places, but not established.

Native: Minn. to Idaho, southw. to Tex. and Calif.]

19. Bidens L.

a. Plant aquatic; submerged leaves finely dissected; rays showy. 1. *B. Beckii*

a. Plant terrestrial.

  b. Achenes linear-spindle-shaped, tapering to a slender apex, 4-grooved and with *3–4 short awns*; rays very short. 2. *B. bipinnata*

  b. Achenes not as above.

    c. Rays large and showy.

      d. Leaves simple; achenes flat or 3–4-angled; awns 2–4, downwardly barbed; heads often cernuous.

e. Outer involucral bracts exceeding the disk, unequal, spreading, foliaceous; rays twice the length of the disk or less; chaff not reddish-tipped; achenes slightly dilated at summit, 4-angled, usually warty; awns 4; stems erect.

f. Heads large, cernuous, the disks 15–25 mm. wide; outer bracts of the involucre 7–8; inner bracts about 8, 7–10 mm. long.

g. Leaves broadly linear or linear-lanceolate, only slightly contracted below the middle, usually connate, unevenly and distantly serrate; plants 2–7 dm. high, sparingly branched. 3. *B. cernua*

g. Leaves elliptic-lanceolate or elliptical, narrowed to a scarcely connate base, more evenly and closely serrate; plants taller, 5–15 dm. high, much branched and generally with more showy heads. 3a. *B. c.*, var. *elliptica*

f. Heads small, usually solitary, obscurely cernuous, the disks 1.5–10 mm. wide; outer bracts of the involucre 2–6; inner bracts 3–6, 2–7 mm. long. 3b. *B. c.*, var. *minima*

e. Outer involucral bracts rarely exceeding the disk, nearly equal, seldom conspicuously foliaceous, slightly fleshy; rays two to four times the length of the disk; chaff reddish-tipped; achenes not dilated above, flat, 1-nerved on the outer face, rarely warty; awns 2–4; heads scarcely cernuous, more helianthoid than in the preceding species; stems decumbent, often floating at base. 4. *B. laevis*

d. Leaves pinnately divided; achenes flat; awns 2, short, upwardly barbed; heads not cernuous. [*B. trichosperma*]

c. Rays scarcely exceeding the disk, or wanting (see also no. 3).

d. Leaves clearly pinnatifid or ternatifid; margins of the achenes upwardly barbed, except rarely toward the top.

e. Outer involucral bracts 4–8; inner bracts oblong, equaling the disk; ray ovaries, when present, hairy, minutely awned; disk achenes narrow, hairy, the margins warty, upwardly barbed to base of awns; corolla orange, goblet-shaped.

f. Leaf divisions 3, long-acuminate; achenes 4–5.5 mm. long; awns upwardly barbed; outer involucral bracts 4. 5. *B. discoidea*

f. Leaf divisions 3–5, pinnately arranged, acute or short-acuminate; achenes 6 mm. long; awns downwardly barbed; outer involucral bracts 6–8.

g. Branches of the plant widespread; leaf divisions green, all distinct; heads short-peduncled; outer involucre only slightly longer than the disk; corollas 2.5–3 mm. long, orange, 5-toothed. 6. *B. frondosa*

g. Branches strongly ascending; leaf divisions pale, those of the upper leaves confluent; heads long-peduncled; outer involucre very foliaceous, two to four times the length of the disk; corollas 3–4 mm. long, more nearly yellow, often 4-toothed; achenes larger and smoother. 6a. *B. f.*, var. *pallida*

e. Outer involucral bracts 10–16, more ciliate; inner bracts ovate-triangular, short; ray ovaries, when present, glabrous, awnless; disk achenes broad and flat (one-half as broad as long), nearly smooth and glabrous, the uppermost fourth of the margin downwardly barbed; corolla stramineous, funnel-form. 7. *B. vulgata*

d. Leaves simple or irregularly lobed; margins of the achenes downwardly barbed, or with mixed ascending and reflexed barbs.

e. Corolla stramineous, funnel-form, 4-toothed; stamens included; achenes broad, flat, 8–11 mm. long, 3-awned, the margins downwardly barbed; outer involucre very foliaceous, much exceeding the disk. 8. *B. comosa*

e. Corolla orange, goblet-shaped, 5-toothed; stamens exserted; achenes 4–6 mm. long, warty, the outer ones 3-awned, the inner ones 4-awned, the margins with mixed ascending and reflexed barbs; outer involucre rarely much exceeding the disk.

f. Leaves nearly sessile, some 3-lobed. 9. *B. connata*

f. Leaves slender-petioled, none lobed. 9a. *B. c.*, var. *petiolata*

1. **B. Beckii** Torr. WATER MARIGOLD.

Floating in the still water of shallow lakes and mill ponds; rare. Aug.

Cayuta Lake, in n. w. part (*D.*); Lake Como (Locke Pond, *D.*); Cayuga Lake, at Cayuga Bridge (*W. W. Rowlee & K. M. W.*). [Homer and Cortland mill ponds (*D.*!).] Locally this species usually occurs in calcareous waters.

Que. to Man., southw. to N. J. and Mo.; infrequent or rare on the Coastal Plain.

This plant is distinctly a Bidens. To separate it as a distinct genus, as is done by some botanists, seems unwarranted.

2. **B.** BIPINNATA L. SPANISH NEEDLES.

Lake Ridge Point, 1880 (*D.*); "Ovid" (*S. H. Wright*, D.); L. V. R. R. yards, Ithaca, 1925 (*W. C. Muenscher*). Probably not native.

R. I. to Nebr., southw. to Fla., Kans., and Ariz.

3. **B. cernua** L.

Ditches and muddy shores, mostly in limy regions; frequent. Aug. 25–Oct.

Magdalen Islands to Hudson Bay and B. C., southw. to N. C., Mo., and Calif.; infrequent on the Atlantic Coastal Plain. Found also in Eurasia.

3a. **B. cernua** L., var. **elliptica** Wiegand. (See Bul. Torr. Bot. Club **26**: 417. 1899. *B. chrysanthemoides* of Cayuga Fl.)

Ditches and low grounds about marshes; very common. Sept.–Oct.

P. E. I. to B. C. and Oreg., southw. to Ky. and Kans.; less frequent along the Atlantic coast.

3b. **B. cernua** L., var. **minima** (Huds.) DC. (See Rhodora **24**: 207. 1922.)

Sphagnum bogs and springy boggy places; rare. Aug. 25–Sept.

Summit Marsh; Chicago Bog; Beaver Brook; Slayton Pond (*L. F. Randolph, A. J. E., & K. M. W.*).

Magdalen Islands to N. H., N. Y., and Lake Superior. Found also in Eu.

4. **B. laevis** (L.) BSP.

Partly floating in deep ditches and swales in the larger marshes; rare. Sept.

Confined to the Ontario plain: Cayuga Marshes (*Clinton*); along Black Creek w. of Savannah (*K. M. W., A. J. E., & L. F. Randolph*); Spring Lake village (same collectors).

Mass. to Ga., along the coast; also cent. N. Y. and Calif.

[**B. trichosperma** (Michx.) Britton. (*Coreopsis trichosperma* of Cayuga Fl.) TICK-SEED SUNFLOWER.

"Specimen in herb., from head of Cayuga Lake, Oct., 1879, (*F. C. Curtice*)" (*D.*, and in C. U. Herb.); not seen since.

Mass. to Va., near the coast; also, N. Y. to Ill. and Ky.]

5. **B. discoidea** (T. & G.) Britton. (*Coreopsis discoidea* of Cayuga Fl.)

On floating logs or boggy shores about peat bogs; rare. Sept.

Spencer Lake, 1922; Dryden Lake (*D.*!). Dudley's station, "near Cayuga L., on the Marsh," is probably a mistake.

Mass. to Mich., southw. to Va., Ohio, La., and Tex., including the Coastal Plain.

6. **B. frondosa** L. BEGGAR'S TICKS.

Low grounds and low waste places, with no apparent lime preference; very common. Aug.–Oct.

Newf. to B. C., southw. to Fla., La., Tex., and Colo., including the Atlantic Coastal Plain.

6a. **B. frondosa** L., var. **pallida** Wiegand. (See Rhodora **26**: 5. 1924. *B. melanocarpa*, var. *pallida* Wiegand, Bul. Torr. Bot. Club **26**: 406, 1899.)

In situations similar to the preceding, and flowering at the same time. Occasional or often abundant along the shores of Cayuga Lake.

N. S. to N. Y. and Ill.

B. frondosa as it usually occurs in the Cayuga Lake Basin has hairy leaves, but smooth individuals are frequently found, especially along the lake shore. The leaves of var. *pallida* are apparently always smooth. As to characters, var. *pallida* might well be a hybrid of *B. frondosa* and *B. comosa*, but the restricted range of the variety near the lake shore does not support this assumption. This variety is of doubtful standing, and should be studied further.

7. **B. vulgata** Greene. (*B. frondosa*, in part, of Cayuga Fl.) BEGGAR'S TICKS.

Damp roadsides and waste places, in richer and heavier soils than those in which the preceding species is found; common. Aug. 15–Sept.

Que. to B. C., southw. to N. Y., N. C., Mo., Colo., and Calif.; infrequent or rare on the Atlantic Coastal Plain.

8. **B. comosa** (Gray) Wiegand.

Ditches by roadsides, and in exsiccated places, in gravelly or sandy alluvial, probably calcareous, soils; frequent. Sept.

Girls' Playground, Cascadilla Glen; Fall Creek, above Forest Home and at Beebe Lake; lake shore, Renwick; roadsides, Cayuga Heights and between Esty and Freeville; Dryden Lake; Farley Point; and elsewhere; apparently absent on sandy acid soils.

Me. to Minn., southw. to N. J., w. Ky., La., and Colo.; rare or absent on the Coastal Plain.

9. **B. connata** Muhl. BEGGAR'S TICKS.

Low grounds and swamps, showing no apparent lime preference; occasional. Aug.–Sept.

Que. to Mich., probably southw. to Ga., Mo., and Nebr., including the Coastal Plain; less common westw. than no. 9a.

A colony of *B. connata* along N. Cayuga St., Ithaca, near Renwick, with upwardly barbed awns, has persisted there for twenty years or more. It is probably the basis of Dudley's entry of *Coreopsis discoidea* from that locality.

9a. **B. connata** Muhl., var. **petiolata** (Nutt.) Farwell. (See Rhodora **10**: 197. 1908.)

In situations similar to the preceding; common. Aug.–Sept.

Me. to Minn. and Kans.; less common near the coast.

20. Galinsoga R. & P.

1. **G.** CILIATA (Raf.) Blake. (See Rhodora **22**: 97, 1920, and **24**: 34, 1922. *G. aristulata* Bickn. *G. parviflora* Cav., var. *hispida*, of authors.)

Rich garden soils and shaded waste places; becoming common. July–Oct.

Of recent introduction, but now abundant in truck gardens of Ithaca and in gardens and along streets in the city; unknown here at the time of publication of Dudley's *Cayuga Flora*.

Me. to Wis. and westw., southw. to N. C., Mo., and Mex. Naturalized from tropical Am.

21. Helenium L.

1. **H. autumnale** L. (Including *H. latifolium* Mill.) SNEEZEWEED.

Along streams and the borders of marshes and along the lake shore, in sandy or gravelly calcareous soils; frequent. Aug. 20–Oct.

Especially abundant on the gravel bars in the creeks of the basin, about the Cayuga Marshes, and on the calcareous sandy shore of Cayuga Lake at Farley Point.

W. Que. and w. Mass. to Man. and Oreg., southw. to Fla. and Ariz.; infrequent on the Atlantic Coastal Plain except in the maritime sands.

22. Achillea (Vaill.) L.

a. Leaves linear-lanceolate, serrate. [*A. Ptarmica*]
a. Leaves bipinnately dissected into fine divisions. 1. *A. Millefolium*

[**A.** PTARMICA L. SNEEZEWEED.

Escaped from cultivation to roadsides and fields; rare. July–Aug.

Highland Ave., Cayuga Heights, by roadside in shaded gully, 1913 (*E. L. Palmer*). Probably not established.

Newf. to Mich. and Mass.; local. Introduced from Eu.]

1. **A. Millefolium** L. COMMON YARROW.

A weed in fields and by roadsides, in various soils; very common. June 10–Sept., rarely later.

General throughout most of N. A. Possibly introduced in cent. N. Y. Found also in Eurasia.

A form with rose-purple rays, forma *roseum* Rand & Redfield (Fl. Mt. Desert), occurs occasionally, as: n. w. of Enfield Falls; between Etna and Ringwood; Ball Hill, Danby (*D.*); Forest Home; and elsewhere.

Some authors consider the yarrow adventive in N. Y.; others believe it to be native; and some consider it both native and adventive.

23. Anthemis (Mich.) L.

a. Rays white.
  b. Rays neutral; achenes warty, 1.2–1.5 mm. long; receeptacle without chaff near the margin; plant strong-scented; leaves finely 3-pinnately dissected. 1. *A. Cotula*
  b. Rays pistillate; achenes not warty, about 2 mm. long; receptacle chaffy throughout; plant not strong-scented; leaves 1–2-pinnately, and more coarsely, divided. 2. *A. arvensis*, var. *agrestis*
a. Rays yellow; leaf divisions broader. [*A. tinctoria*]

1. **A.** COTULA L. MAY-WEED. DOG FENNEL.

A weed on dry roadsides and in waste places, mostly in rather rich gravelly soils; very common. July–Nov.

Generally distributed in N. A. except in the extreme North. Naturalized from the Old World.

2. **A.** ARVENSIS L., var. AGRESTIS (Wallr.) DC. CORN CHAMOMILE.

A weed in situations similar to the preceding but in heavier soil; common. May 15–Aug.

N. S. to Mich., southw. to Va. and Mo.; also on the Pacific coast. Naturalized from Eu.

[**A.** TINCTORIA L. YELLOW CHAMOMILE.

Found along Cayuga Heights Road in 1915, but not established. Common in cultivation.]

24. Chrysanthemum (Tourn.) L.

a. Heads 4–6 cm. in diam., solitary; leaves pinnately incised.
b. Basal leaves spatulate-obovate, crenate; middle and upper cauline leaves oblong or oblanceolate, crenate or dentate. 1. *C. Leucanthemum*
b. Basal leaves coarsely and irregularly toothed or pinnatifid; middle and upper cauline leaves narrowly oblong or oblanceolate, subpinnatifid at base; (heads slightly smaller). 1a. *C. Leucanthemum*, var. *pinnatifidum*
a. Heads 2 cm. in diam. or less, corymbose; leaves 2-pinnately divided. 2. *C. Parthenium*

1. **C.** LEUCANTHEMUM L. DAISY.

Lawn, Baker Laboratory, C. U. campus, 1925 (*S. H. Burnham*). Probably established.

Newf. and e. Que. to N. J.; rare southw. Naturalized from Eu.

1a. **C.** LEUCANTHEMUM L., var. PINNATIFIDUM Lecoq & Lamotte. DAISY.

A weed in hayfields and by roadsides, generally in gravelly soil; very common. June–July, rarely later.

General in n. e. U. S., less abundant in the South and West. Naturalized from Eurasia.

A plant with rays all tubular and deeply lobed was found on a drumlin in the northeastern corner of Butler Township.

2. **C.** PARTHENIUM (L.) Bernh. FEVERFEW.

Gravelly soil; rare. July.

Escaped from gardens: "thoroughly established throughout Stevens Woods on west shore of Cayuga" (*D.*); "occasional near Inlet and in Ithaca" (*D.*); Forest Home; Six Mile Creek; Kidders.

Native of Eu.

25. Tanacetum L.

a. *Ultimate divisions of the leaves sparingly incised-serrate.* 1. *T. vulgare*
a. Ultimate divisions of the leaves finely and closely denticulate. 1a. *T. vulgare*, var. *crispum*

1. **T.** VULGARE **L.** TANSY.

Roadsides and waste places, in gravelly or sandy soil; frequent. July–Sept.

Near White Church; Cayuga Heights; Lake Como; South Lansing; Levanna; Merrifield; Union Springs; Canoga. In the northern part of the Cayuga Lake Basin, this species is more common than the following variety.

N. S. to Minn. and Oreg., southw. to Ga., Mo., and Nev. Introduced and naturalized from Eu.

1a. **T.** VULGARE L., var. CRISPUM DC.

In localities similar to the preceding; more frequent.

West Danby; Caroline Pinnacles; Brookton; upper Enfield Glen; n. of Coy Glen; Esty; Taughannock; Union Springs; Montezuma. In the southern part of the Cayuga Lake Basin, this variety is more common than the typical form.

Range approximately the same as that of the typical form. Naturalized from Eu.

26. Artemisia L.

a. Leaves green and glabrous, or nearly so, on both surfaces.
b. Leaves 1-pinnatifid, the divisions 1–4 mm. wide, coarsely toothed. 1. *A. biennis*

b. Leaves 2–3-pinnatifid, the divisions 0.2–0.8 mm. wide, entire. 2. ***A. Abrotanum***
a. Leaves more or less gray- or white-woolly on both surfaces, 1–2-pinnatifid (see also 3d *a*).
b. Divisions of the leaves 1 mm. wide or less. 3. *A. pontica*
b. Divisions of the leaves 2–5 mm. wide. 4. *A. Absinthium*
a. Leaves green and glabrous above, white-woolly beneath.
b. Leaves coarsely pinnatifid and cleft, broadly ovate or oval. [*A. vulgaris*]
b. Leaves merely serrate, lanceolate. 5. *A. serrata*

1. **A.** BIENNIS Willd.

Dry gravelly railroad banks and yards; rare. Aug. 15–Sept.
L. V. R. R. freight yards near the Ithaca station, 1917 (*A. R. Bechtel & K. M. W.*); waste soil, Montezuma Marshes, 1918.
Ohio to Mo. and B. C., southw. to Tenn., Nebr., and Calif. Adventive as a weed eastw.

2. **A.** ABROTANUM L. SOUTHERNWOOD.

Roadsides and waste places, in light soils; rare. Sept.
Yard, Railroad Ave., Ithaca (*W. W. Rowlee*); garbage dump at Union Springs.
Mass. to s. Ont., N. Y., and Nebr. Adventive from Eu.
A specimen in the C. U. Herbarium, collected by Dudley at Junius and labeled *Artemisia Abrotanum*, is *A. pontica*.

3. **A.** PONTICA L. ROMAN WORMWOOD.

Roadsides and waste places, in sandy or gravelly soil; rare. July–Aug.
By road along creek above Enfield Falls, 1917; large area by roadside s. w. of Pout Pond, 1885 (*D.* in C. U. Herb.) and 1919 (*L. F. Randolph, A. J. E., & K. M. W.*).
Mass. to Colo., southw. to N. J., Pa., and Ohio. Adventive from Eu., or an escape from cultivation.

4. **A.** ABSINTHIUM L. COMMON WORMWOOD.

Roadsides and waste places, in gravelly, rarely heavier, soils; rare. July 20–Oct.
Escaped from gardens: near foundation of old Agricultural College barn, 1914, this station now destroyed; roadside n. of Willets station, 1879 (*D.*); w. of Lowery Ponds (*L. H. MacDaniels & A. J. E.*).
Newf. to Hudson Bay and Mont., southw. to N. C., w. Ont., and N. Dak.
Native of Eu.

[**A.** VULGARIS L. COMMON MUGWORT.

Doubtfully reported from Union Springs.
Native of Eu.]

5. **A.** SERRATA Nutt.

Gravelly waste places; rare. Aug.–Sept.
Roadside, Renwick, 1916 and 1919.
Ill. to Dak. Sparingly adventive in N. Y. State.

27. **Tussilago** (Tourn.) L.

1. **T.** FARFARA L. COLTSFOOT.

Damp open banks, usually in heavy clay soils; common. April.
Generally distributed throughout the basin, in the clays; rare in other soils.
E. Que. to Minn., southw. to Pa. and Ohio; infrequent on the Coastal Plain and in other sandy regions. Naturalized from Eu.

28. Petasites (Tourn.) Mill.

1. **P. palmatus** (Ait.) Gray. SWEET COLTSFOOT.

Shaded calcareous springy places; rare. April–May 15.

In a marsh s. of Pulpit Rock, Buttermilk Glen, 1873 (*G. W. Wood*), exterminated in 1875 (*D.*); near Smith Corners n. of Cayuta Lake, 1875, station later destroyed (*D.*).

Lab. and Newf. to Alaska, southw. to e. Mass., w. Conn., N. Y., Mich., Wis., and Minn.

29. Erechtites Raf.

1. **E. hieracifolia** (L.) Raf. FIREWEED.

Thickets and clearings in not too dry gravelly soil, in both acid and alkaline regions; common. Aug.–Sept.

P. E. I. to Ont., southw. to Fla., Ill., Nebr., and Tex., including the Coastal Plain.

Individuals with the upper leaves reduced in size (var. *intermedia* Fernald, see Rhodora **19**: 27, 1917) are even more common than those with large leaves.

30. Senecio (Tourn.) L.

a. Leaves all similar, the cauline ones pinnately lobed; heads discoid. 1. *S. vulgaris*

a. Leaves of different types, the basal ones cordate-orbicular; heads usually radiate. 2. *S. aureus*

1. **S.** VULGARIS L. COMMON GROUNDSEL.

A weed in rich cultivated ground, in more or less calcareous districts; scarce. June 15–Sept.

Below Cascadilla Place, 1869 (*D.*); on C. U. campus, 1881 (*D.*); now frequent between L. V. R. R. yards and Cayuga Lake, and on C. U. campus; Aurora, by the railroad (*D.*); especially abundant in gardens at Union Springs.

Newf. to Hudson Bay, Minn., and B. C., southw. to N. C. and Mich.; rare on the Atlantic Coastal Plain and in granitic N. E. Naturalized from Eu.

2. **S. aureus** L. GOLDEN RAGWORT.

Springy and boggy calcareous meadows, rarely on wet rocks; frequent. May 15–June.

Headwaters of Cayuga Inlet; Spencer; Larch Meadow; Six Mile Creek; Fall Creek; Mud Creek, Freeville; McLean Bogs; Westbury Bog; and elsewhere. The species occurs on wet rocks at Beebe Lake and Six Mile Creek.

Newf. to Wis., southw. to Fla., Mo., and Tex.; frequent along the coast.

Though all of the above-named stations are in marly meadows or on limy rocks, the plant is by no means confined to calcareous soil in N. E. and in the coastal regions.

31. Arctium L.

a. Outer and inner involucral bracts subequal, the outer bracts about 10 mm. long except in the smallest heads; corollas 10–13 mm. long, the limb longer than the slender tube, the teeth 1.8–2.2 mm. long; heads large, corymbose; petioles solid, very rarely some of them hollow. 1. *A. Lappa*

a. Outer involucral bracts successively shorter than the inner, the outermost ones 3–5 mm. long; corollas 9–10 mm. long, the limb almost or quite equaling the tube, the teeth proportionally shorter, 1–1.2 mm. long; petioles usually hollow.

  b. Heads racemose or racemosely clustered, small to medium-sized, 1.5–3 cm. in diam. 2. *A. minus*

  b. Heads corymbose, averaging somewhat larger. 2a. *A. minus*, var. *corymbosum*

1. **A.** LAPPA L. GREAT BURDOCK.

A weed in rich soil and in clay, by roadsides and in waste places; locally common. Aug.–Sept. 20.

Observed chiefly about Ithaca, very rarely elsewhere as at Caroline Center.

N. E. and the East Central States, possibly farther westw.; rare in sandy regions. Naturalized from Eu.

2. **A.** MINUS (Hill) Bernh. (Including *A. nemorosum* Lej.) SMALLER BURDOCK.

A weed in situations similar to the preceding or perhaps in more sterile soils, often in clay; very common, and generally distributed. Aug.–Sept.

Widely distributed in N. A. westw. to Colo. Naturalized from Eu.

2a. **A.** MINUS (Hill) Bernh., var. CORYMBOSUM Wiegand. (See Rhodora **26**: 5. 1924.)

In situations similar to the preceding; not quite so common.

Range same as that of the typical form, or possibly more eastern. Naturalized from Eu.

The various European treatments of Arctium are not in accord as to the extent of segregation of *A. minus*, or on what characters the segregation should be based. Following what seemed to be European practice, Fernald and Wiegand (Rhodora **12**: 43, 1910) segregated *A. nemorosum* Lej. on the basis of larger heads, more spreading involucre, and the dark ground color of the achene. A. H. Evans (Journ. Bot. **51**: 113, 1913) separates *A. vulgaris* (Hill) Evans on the larger corymbose heads and spreading involucre, and refers *A. nemorosum* Lej. to *A. minus*. Hill's plate of *Lappa vulgaris*, however, has more the appearance of *A. Lappa*. A study of the material about Ithaca and elsewhere seems to show that besides *A. Lappa* there is but one species, *A. minus* (Hill) Bernh. The heads vary somewhat in size, the larger heads having less appressed involucres; but the seeds, the florets, the involucres, and the leaves are practically identical. On the other hand, good characters separate this species from *A. Lappa* L.

32. Echinops L.

1. **E.** RITRO L. (See Bailey, Man. Cult. Pl., p. 789. 1924.) GLOBE THISTLE.

"Caroline Center, escaped from cult. and spreading rather freely, along a brook. (*F. T. Wilson*, 1885.)" (*D.*, and in C. U. Herb.); near Lake Como, 1923 (*G. B. & L. N. Upton*).

Introduced from Eu.

33. Carduus (Tourn.) L.

1. **C.** NUTANS L. MUSK THISTLE.

A weed in dry gravelly pastures; rare. July.

Between the C. U. barns and Forest Home, over an area of many square feet, 1913 (*E. Dean & A. J. E.*); Dryden, 1912 (*Miss L. J. Sweetland*). Of recent introduction, but well established.

Occasional in the Atlantic States, but apparently rare or absent on acid soils. Naturalized from Eurasia.

34. Cirsium (Tourn.) Mill.

a. Heads large, 3–9 cm. in diam.; plant not stoloniferous.

b. Outer and inner involucral bracts spine-tipped; leaves strongly arachnoid beneath, decurrent. 1. *C. lanceolatum*

b. Outer bracts spine-tipped, inner bracts soft and spineless; leaves not decurrent (see also 3d *b*).

c. Leaves white-tomentose beneath, the divisions few, rather long and narrow; heads medium-sized. 2. *C. discolor*

c. Leaves arachnoid or green beneath, the divisions many, short and broad; heads very large (4–8 cm. broad). 3. *C. pumilum*

b. Outer and inner bracts all spineless, merely mucronate; leaves arachnoid beneath, mostly with rather deep and narrow divisions, not decurrent. 4. *C. muticum*

a. Heads small, 2.5 cm. in diam. or less; involucral bracts spineless or the outer ones with short prickly points; leaves not decurrent, scarcely woolly, with many short broad lobes; plant strongly stoloniferous. 5. *C. arvense*

1. **C.** LANCEOLATUM (L.) Hill. BULL THISTLE.

A weed in dry pastures, fields, and waste places, mostly in rich gravelly non-acid soils; common, but never abundant. July 15–Sept.

Scarce on the sterile, more residual, soils of the higher hills of the basin, and in the sands n. of the lake.

Newf. to Oreg., southw. to Fla., Nebr., and Calif.; less frequent on the Atlantic Coastal Plain. Naturalized from Eurasia.

2. **C. discolor** (Muhl.) Spreng. (*Cnicus altissimus*, var. *discolor*, of Cayuga Fl.)

On banks in rich gravelly soils; scarce. Aug.

Negundo Woods (*D.*); University Grove, formerly (*D.*); Indian Spring marsh (*D.*); Myers Point, and occasionally along the lake shore to Levanna and Lockwood Flats (*D.*!); Salmon Creek.

N. B. to S. Dak., southw. to Ga., Mo., and Nebr. In the coastal region the plant is more abundant close to the ocean, possibly in saline soils.

3. **C. pumilum** (Nutt.) Spreng. PASTURE THISTLE.

Fields and pastures, usually in dry sandy or gravelly acid soils, rarely in more alkaline gravels; frequent. July–Sept.

Confined chiefly to the hills s. w., s., and s. e. of Ithaca: n. of Spencer Lake, and hill pasture n. w. of North Spencer; e. of South Pinnacle (*D.*) and n. of North Pinnacle, Caroline; s. e. of Brookton; South Hill (*D.*!); near Coy Glen; n. of Fall Creek (*D.*!); Ringwood; and elsewhere.

Me. to N. Y., southw. to S. C. and W. Va., including the Coastal Plain.

4. **C. muticum** Michx. SWAMP THISTLE.

Swampy and springy places in mucky soil, in both calcareous and noncalcareous situations; frequent, and generally distributed. Aug.–Sept.

Newf. to Sask., southw. to Fla. and Tex., including the Coastal Plain.

5. **C.** ARVENSE (L.) Scop. CANADA THISTLE.

A weed in fields, cultivated grounds, and waste places, especially in the richer, heavier soils; very common, and generally distributed. July–Oct.

Newf. and B. C., southw. to Va., Nebr., and Utah. Naturalized from Eu.

The white-flowered form is occasional.

35. **Onopordum** (Vaill.) L.

1. **O.** ACANTHIUM L. SCOTCH THISTLE.

Roadsides and waste places; occasional. July–Aug.

Near Percy Field; C. U. campus; a bad weed in a dry gravelly pasture 1½ miles n. of Slaterville.

N. B. and N. S. to Ont. and Mich., southw. to N. J. Introduced from Eurasia.

36. Centaurea L.

a. Leaves not pinnatifid, rarely lobed.
  b. Involucral bracts with abruptly much-dilated tips; marginal flowers moderately enlarged.
    c. Body of dilated tip of bract orbicular, lacerate, covering the scales underneath, brown or yellowish. 1. *C. Jacea*
    c. Body of dilated tip of bract oval, triangular, or ovate-lanceolate, pectinate.
      d. Heads globular; cilia longer than the width of the body of the dilated tip; tips large, completely covering the scales beneath. 1a. *C. Jacea*, var. *nigra*
      d. Heads ovoid; cilia about equaling the width of the body of the dilated tip; tips not completely covering the scales beneath. 1b. *C. Jacea*, var. *pratensis*
  b. Involucral bracts lanceolate, without dilated tips; marginal flowers especially large and showy. [*C. Cyanus*]
a. Leaves pinnatifid, with narrow divisions; involucral bracts without dilated tips but with the apex pectinate. 2. *C. maculosa*

1. **C.** JACEA L.

A weed in dry sandy or gravelly fields; rare. Aug.–Sept.

Hill s. w. of West Danby, 1922 (*W. C. Muenscher & W. E. Manning*); Bull Hill, Newfield, 1919; two miles n. of Connecticut Hill, 1923 (*J. P. Young*); near Mud Pond, McLean Bogs, 1923 (*J. A. Turner*); n. e. of Pout Pond, 1916–1919 (*K. M. W. & F. P. Metcalf*); apparently well established at each place.

Naturalized from Eu. in various parts of N. A.

1a. **C.** JACEA L., var. NIGRA (L.) Briq. KNAPWEED. SPANISH BUTTONS.

A weed by roadsides and in fields, in gravelly soils (a calcifuge, *Briquet*); rare, *but becoming more frequent. July–Aug.*

Enfield Township (*J. P. Young*); C. U. campus, near McGraw Hall, 1875 (*D.*); pasture near McLean Bogs; field, e. branch of Salmon Creek, Genoa (*A. H. Wright*).

Naturalized from Eu. in various parts of N. A.

1b. **C.** JACEA L., var. PRATENSIS (Thuill.) Vis.

A weed in dry gravelly or stony soils; rare. Aug.

Hilltop, North Spencer (*A. J. E. & L. H. MacDaniels*); White Church (*L. F. Randolph*).

Introduced from Eu. in various parts of N. A.

Briquet (Monog. de Cent. d. Alps Marit., 1902) is apparently correct in reducing these two forms, 1a and 1b, to varieties of *C. Jacea.*

[**C.** CYANUS L. BACHELOR'S BUTTON. CORN-FLOWER.

An occasional escape from gardens to waste places.

C. U. campus (*D.!*); "E. State Street, Ithaca, and elsewhere, appearing almost every year" (*D.*); "in 1885, in a wheat field east of Casc. Woods, many specimens" (*D.*). Doubtfully established.]

2. **C.** MACULOSA Lam.

A weed in dry gravelly or sandy fields; rare, but becoming more frequent. Aug.–Sept.

Hilltop, North Spencer; pastures one-half mile n. of Summit Marsh, abundant; e. of Dryden village, 1912 (*Miss L. J. Sweetland*); s. of Mud Pond, McLean Bogs; e. of Pout Pond. First reported in 1912.

Mass. to N. J. and Pa. Naturalized from Eu.

37. **Lapsana** L.

1. **L.** COMMUNIS L. NIPPLE-WORT.

A weed by roadsides, in rich, somewhat calcareous, soils; scarce. July–Aug.

Amphitheater, Six Mile Creek; Humboldt St., near Coy Glen; wood road in Coy Glen; corner of Central and South Aves., and near Landscape Art Building, C. U. campus; above the "Loop," Cornell Heights; Stewart Park; Taughannock Point. Of recent introduction. First reported in 1913.

Que. to Mich., southw. to Pa. Naturalized from Eu.

38. **Cichorium** (Tourn.) L.

1. **C.** INTYBUS L. CHICORY. SUCCORY. BLUE SAILORS.

Gravelly roadsides, fields, and waste places; common. July–Aug.

Not common in sandy acid soils, otherwise generally distributed throughout the basin; very abundant near Dryden Lake, near Romulus, and at Farley Point. The plant has increased in frequency in recent years.

Newf. to Minn. and Wash., southw. to Fla., Kans., Colo., and Calif. Naturalized from Eu.

39. **Hypochaeris** L.

1. **H.** RADICATA L. CAT'S-EAR.

Rich cultivated fields and lawns, in rather light soil; rare. July–Sept.

Three miles n. of Slaterville, 1919 (*K. M. W., A. J. E., & L. F. Randolph*); lawn of the Agricultural College, 1917 (*A. Gershoy*), still persisting; Eames lawn, Cayuga Heights, 1923; lawn, n. end of Highland Road, Cayuga Heights, 1925 (*W. C. Muenscher*). Of recent introduction.

Newf. to Ohio, southw. to N. J. and Pa., also Colo. and the Pacific coast. Adventive from Eu.

40. **Apargia** Scop.

1. **A.** AUTUMNALE (L.) Hoffm. (*Leontodon autumnalis* of Gray's Man., ed. 7.) FALL DANDELION.

Roadsides and fields, in light acid or neutral soils; rare. Aug.–Sept.

Roadside on hilltop w. of West Danby, 1919 (*A. J. E., K. M. W., & L. F. Randolph*); e. of Bull Hill, Newfield, 1924. Of recent introduction.

Newf. to Mich., southw. to Pa. and Ohio. Naturalized from Eu.

Mackenzie (Rhodora **27**: 47. 1925) has shown that the name *Leontodon* is a synonym of *Taraxacum*.

41. **Picris** L.

1. **P.** HIERACIOIDES L.

Cultivated fields, in gravelly soil; rare. July–Sept.

Near Slaterville Swamp, 1919.

N. J. and N. Y. to Ill., southw. to Pa., and in ballast about the seaports. Adventive from Eurasia.

42. **Tragopogon** (Tourn.) L.

a. Flowers yellow; peduncle little thickened.	1. *T. pratensis*
a. Flowers purple; peduncle thickened at summit.	2. *T. porrifolius*

1. **T.** PRATENSIS L. GOAT'S BEARD.

A weed along roadsides and railroad embankments in the richer gravelly soils; frequent, and generally distributed. June–July.

N. B. and N. S. to Man., southw. to N. J., Ohio, and Colo. Naturalized from Eu.

2. **T.** PORRIFOLIUS L. SALSIFY. VEGETABLE OYSTER. OYSTER-PLANT.

In situations similar to the preceding, but in heavier soils; frequent, and widely distributed. June–July.

In the Cayuga Lake Basin, most abundant about Ithaca.

Ont. and Minn. to B. C., southw. to Ga., Nebr., and Calif. Escaped from gardens, and more or less naturalized. Native of Eu.

A form resembling *T. porrifolius*, but with brown flowers, occurs frequently on East Hill, Ithaca. This is apparently a hybrid with *T. pratensis*.

43. **Chondrilla** (Tourn.) L.

1. **C.** JUNCEA L. SKELETON-WEED. GUM SUCCORY.

Dry gravelly knolls; rare. Aug.–Sept.

On a knoll s. of Mud Pond, McLean Bogs, 1917, still persisting.

N. Y. and Del., to Md. and Va. Naturalized from Eu.

44. **Taraxacum** (Haller) Ludwig

a. Leaves shallowly divided; heads 3–5 cm. in diam., golden yellow; achenes olive-green or brownish. 1. *T. officinale*

a. Leaves deeply divided; heads 2–3 cm. in diam., sulphur yellow; achenes reddish. 2. *T. laevigatum*

1. **T.** OFFICINALE Weber. (Doubtfully *T. vulgare* (Lam.) Schrank.) COMMON DANDELION.

Roadsides and fields, in rich soil; common. May–June, and sporadically until frost.

Most abundant in the heavier soils of the basin, and in clay.

Probably native in northern N. A., but now a naturalized weed from Eu. through the greater part of N. A. Found also in Asia.

Taraxacum is in the list of *nomina conservanda* of the International Code.

2. **T.** LAEVIGATUM (Willd.) DC. (See Bot. Gaz. **70**: 350. 1920. *T. erythrospermum* of Gray's Man., ed. 7.)

In more gravelly or sandy and less fertile soils than the preceding, especially in lawns; frequent. May–June, or later.

Common on lawns and banks on C. U. campus; distribution elsewhere not determined.

Me. to Ont. and Alberta, southw. to Pa., Ill., and Wyo. Naturalized from Eu.

45. **Sonchus** (Tourn.) L.

a. Heads large, 4 cm. in diam., deep yellow; perennials, with creeping rootstocks.
- *b*. Involucre and peduncles glandular-setose. 1. *S. arvensis*
- *b*. Involucre and peduncles glabrous. 1a. *S. arvensis*, var. *glabrescens*

a. Heads smaller, 1.2–2.5 cm. in diam., pale yellow; annuals.
- *b*. Leaves runcinate-pinnatifid, soft-spiny or unarmed; achenes longitudinally striate and cross-wrinkled. 2. *S. oleraceus*
- *b*. Leaves pinnately lobed or undivided, densely spiny-toothed; achenes ribbed, otherwise smooth. 3. *S. asper*

1. **S.** ARVENSIS L. FIELD SOW THISTLE.

A weed in rich cultivated or waste places and on shores, often in heavy clay soils; frequent. July–Sept.

The Mack farm s. of Ithaca (*D.*); near Coy Glen; various streets in Ithaca (*D.*); C. U. campus, in several places; Renwick; Myers Point (*D.*); Sheldrake (*D.*); Union Springs (*D.*!); Cayuga (*D.*); about Salt Pond w. of Howland Island; and elsewhere.

Newf. to Minn. and B. C., southw. to N. J., Colo., and Utah. Naturalized from Eu.

A difficult weed to eradicate. Dudley gives interesting historical facts regarding its introduction in N. Y. State.

1a. **S.** ARVENSIS L., var. GLABRESCENS Wimm. & Graeb. (See Rhodora **12**: 145. 1910.)

In situations similar to the preceding; frequent. July–Sept.

C. U. campus, near the baseball cage and back of Sibley College; s. of Renwick, and near the Renwick Park (Stewart Park) buildings.

Occasional in e. N. A.

Bayard Long (see Torreya **22**: 91, 1922) considers the Sibley College specimens to be *S. uliginosa* Bieb. The other local specimens with glabrous involucre were not seen by Long, but they are all similar to the Sibley College specimens. They seem to differ somewhat from typical *S. arvensis* in the characters given by Long, and he may be correct in considering them as specifically distinct.

2. **S.** OLERACEUS L. COMMON SOW THISTLE.

A weed in waste places and cultivated fields, in rich soil; common. Aug.–Sept.

Generally distributed as a weed over most of the earth, except in the extreme North. Naturalized from Eu.

The leaf outline varies greatly, the more extreme types being as follows:

(*a*) The typical form: terminal division of leaf broadly triangular, lateral divisions present; common.

(*b*) Forma *triangularis* (Wallr.) G. Beck: terminal division of leaf broadly triangular, lateral divisions wanting; near the salt works, Ithaca flats.

(*c*) Forma *lacerus* (Willd.) G. Beck: terminal division of leaf narrow; athletic field, C. U. campus; Highland Ave.; Cayuga Heights; West Hill, near the L. V. R. R. station; Ithaca flats, near the salt works.

3. **S.** ASPER (L.) Hill. SPINY-LEAVED SOW THISTLE.

In situations similar to the preceding; common. Aug.–Sept.

Distribution similar to that of the preceding species. Naturalized from Eu.

46. Lactuca (Tourn.) L.

a. Leaves with prickly midrib and margins.
  b. Leaves pinnately lobed. — 1. *L. scariola*
  b. Leaves not lobed. — 1a. *L. scariola*, var. *integrata*

a. Leaves not prickly.
  b. Flowers yellow; achenes distinctly slender-beaked, 1-nerved on each face.
    c. Involucre 16–22 mm. long; achenes 7–9 mm. long; pappus 9–12 mm. long; leaves sparingly and coarsely setose along the midrib, the lateral divisions broadest above the base, often obliquely truncate at the apex. — 2. *L. hirsuta*
    c. Involucre 10–14 mm. long; achenes 5–6 mm. long; pappus 5–7 mm. long; leaves usually glabrous, the lateral divisions broadest at base or apex, or the leaves unlobed.
      d. Leaves with linear-falcate, usually entire, lobes; the upper unlobed leaves, if any, linear or linear-lanceolate. — 3. *L. canadensis*
      d. Leaves with broadly falcate or obovate and obliquely truncate, entire or

toothed, lobes; upper leaves, when dissimilar, unlobed and lanceolate or ovate-lanceolate, rarely oblanceolate or obovate, entire or toothed (see also 3d *d*). 3a. *L. canadensis,* var. *latifolia*

d. Leaves all unlobed, or the basal ones slightly lobed.

e. Leaves lanceolate to ovate-lanceolate, entire or rarely toothed, the lowermost ones sometimes slightly lobed. 3b. *L. canadensis,* var. *integrifolia*

e. Leaves oblanceolate or obovate, usually toothed. 3c. *L. canadensis,* var. *obovata*

b. Flowers pale blue; achenes narrowed above, but not slender-beaked, 3-nerved on each face. 4. *L. spicata*

1. L. SCARIOLA L. PRICKLY LETTUCE.

Gravelly waste places, mostly in calcareous soils; rare. Aug.

Library slope, C. U. campus; bank of Fall Creek between Lake St. and Cayuga St., Ithaca; roadside, Cayuga Heights; Kidders. Of recent introduction.

N. E. to Ohio, southw. to Ga., Tenn., and Mo., but mostly westw. Adventive from Eu.

1a. L. SCARIOLA L., var. INTEGRATA Gren. & Godr.

In situations similar to the preceding; common. Aug.

Widely distributed across the northern part of the continent. Naturalized from Eu.

2. L. **hirsuta** Muhl.

Dry open banks, in gravelly or sandy, somewhat acid, soils; rare. Aug.

A few plants along the Boulevard Road, between the s. w. corner of Cayuga Lake and Glenwood, 1915 (*A. J. E. & L. H. MacDaniels*), found again in 1920.

Que. to Ala. and Tex., chiefly e. of the Allegheny Mts., especially on the Coastal Plain.

3. L. **canadensis** L. WILD LETTUCE.

Dry gravelly banks by roadsides, and in similar situations, with little reference to the lime content of the soil; common. July–Sept.

Absent or rare in the heavier soils of the basin.

N. S. to B. C., southw. to Ga., Ala., La., Ark., and Colo., including the Atlantic Coastal Plain.

The form with the leaf bases not sagittate but tapering (forma *angustipes* Wiegand) occurs at Sheldrake, which is the type locality of this form.

3a. L. **canadensis** L., var. **latifolia** O. Kuntze. (See Rhodora 22: 9. 1920.)

In situations similar to the preceding; frequent.

Enfield Glen; near Glenwood; Renwick slope; shore of Cayuga Lake, from Renwick to Myers; and elsewhere.

P. E. I. to Wis., southw. to Fla. and Okla.

The form without the sagittate leaf-base is forma *exauriculata* Wiegand: Enfield Glen; McKinneys; Myers Point.

3b. L. **canadensis** L., var. **integrifolia** (Bigel.) Gray.

In situations similar to the preceding; frequent.

Six Mile Creek; Cascadilla Creek; Fall Creek; Ithaca flats; Cayuga Heights; and elsewhere.

P. E. I. to Wis., southw. to Ga., Ill., Okla., and Nebr.

The form with the leaf base not auricled is forma *angustata* Wiegand: Six Mile Creek; L. V. R. R. yards, Ithaca.

3c. **L. canadensis** L., var. **obovata** Wiegand.

In situations similar to the preceding; infrequent or rare.

Norton Landing (*D.* in C. U. Herb.); and probably elsewhere.

Me. to Ind. and Nebr., southw. to N. J. and Okla.

[The form without leaf auricles is forma *stenopoda* Wiegand, not reported from the Cayuga Lake Basin.]

4. **L. spicata** (Lam.) Hitchc. (*L. leucophaea* of Cayuga Fl.) BLUE LETTUCE.

Damp thickets, in rich soil; common, and generally distributed. Aug.–Sept.

Newf. to Man., southw. to N. C., Tenn., Iowa, and Colo.; occasional on the Coastal Plain, but much more abundant inland in the richer soils.

A hybrid of *L. spicata* and *L. canadensis* (*L. Morssii* Robins.), with white pappus and slightly beaked, 3-nerved achenes, has been found along the road north of Enfield Glen.

47. Crepis L.

1. **C.** CAPILLARIS (L.) Wallr. HAWK'S BEARD.

Lawns and other grassy places, in rather light soil; occasional. June–Sept.

C. U. campus (*S. H. Burnham*); one-half mile e. of C. U. farm barns; Lake View Cemetery, Ithaca; Highland Ave., Cayuga Heights, 1913 (*E. L. Palmer*); Cayuga Heights Road; alluvial field along Clyde River, Galen. Of recent introduction, having been first reported in 1913.

Conn. to N. Y., southw. to N. J. and Pa.; perhaps more widely distributed. Adventive from Eu.

48. Prenanthes (Vaill.) L.

a. Principal involucral bracts 8.	
b. Pappus cinnamon color.	1. *P. alba*
b. Pappus tawny or whitish.	2. *P. trifoliolata*
a. Principal involucral bracts 5.	3. *P. altissima*

1. **P. alba** L. RATTLESNAKE ROOT. WHITE LETTUCE. LION'S-FOOT.

Open woods and thickets if not too dry, in rather heavy, slightly calcareous or neutral, soils; frequent. Aug. 1–Sept. 15.

Lower Six Mile Creek; Cascadilla woods (*D.*!); Fall Creek woods; around Mud Creek, Freeville; Paine Creek; and elsewhere; less abundant in the more acid sandy soils of the basin.

S. Me. to Sask., southw. to Ga., Ky., and Ill.; rare or absent on the Coastal Plain.

A form with cauline leaves deeply 3–5-parted, and the lobes pinnatifid, occurs in Cascadilla woods.

2. **P. trifoliolata** (Cass.) Fernald. (*P. Serpentaria* of Cayuga Fl.) RATTLESNAKE ROOT. GALL-OF-THE-EARTH. LION'S-FOOT.

In situations similar to the preceding, in gravelly or sandy, more or less acid, soils; more common. Aug. 1–Sept. 15.

Widely distributed in dry woodlands on the high sterile hills of the basin and in the ravines; absent in the richer woods.

Newf. and Que. to N. Y. and Mo., southw. to N. C. and in the mts. to Tenn., including the Coastal Plain.

The leaf outline varies greatly. The principal types are as follows: (a) leaves not parted; (b) leaves parted, the divisions not stalked; (c) leaves divided, the divisions of the lower and of the middle leaves stalked.

3. **P. altissima L.** RATTLESNAKE ROOT. LION'S-FOOT.

Sheltered banks, or deep, chiefly moist, woodlands, in rich gravelly soils; frequent. Aug. 25–Oct. 10.

Rare or absent on the chestnut soils of the Spencer and Danby hills; frequent about McLean and in the ravines of the basin; local in low sandy, possibly mucky, woods, Junius.

Newf. to Man., southw. to Ga. and Tenn.; rare on the Coastal Plain.

The following extreme types of leaves may be noted: (a) leaves not lobed; (b) leaves deeply lobed.

49. Hieracium (Tourn.) L.

a. Leaves all basal, or 1–2 also on the stem near its base.
- *b.* Plant with elongated stolons; rootstocks slender, creeping.
  - *c.* Leaves tomentose beneath; scapes bearing 1–3 (4) heads. 1. *H. Pilosella*
  - *c.* Leaves not tomentose beneath; scapes bearing several or many heads, in rather dense clusters.
    - *d.* Flowers orange. 2. *H. aurantiacum*
    - *d.* Flowers yellow. 3. *H. pratense*
- *b.* Plant without elongated stolons; rootstocks short and stout; inflorescence loose.
  - *c.* Leaves oblanceolate or spatulate, green. 4. *H. florentinum*
  - *c.* Leaves obovate or elliptic-oblong, usually purple-veined. 5. *H. venosum*

a. Leaves mostly cauline, scattered.
- *b.* Heads of medium size or small, 1–2.3 cm. in diam.
  - *c.* Plant glabrate and glaucous (except the stem base), slender-branched; leaves lanceolate, acute, few-toothed. 6. *H. paniculatum*
  - *c.* Plant rough-hairy, stouter; leaves obovate, obtuse, subentire. 7. *H. scabrum*
- *b.* Heads large, 2.5–4.5 cm. in diam.; leaves coarsely toothed. 8. *H. canadense*

1. **H. PILOSELLA** L. MOUSE-EAR.

Lawns and grassy banks; rare. June–July.

Wiegand lawn, Upland Road, Cayuga Heights, 1920, and still persisting.

Eastern States. Naturalized from Eu.

2. **H. AURANTIACUM** L. ORANGE HAWKWEED. DEVIL'S PAINT-BRUSH.

A weed in dry fields and pastures, in rather heavy sterile soils and often in gravelly light soils; very abundant. June–July 10.

Of recent introduction, but now common everywhere throughout the basin, in the proper soils. Dudley gives interesting notes on the early records of its appearance here.

N. B. to Ont., southw. to N. J. and Pa. Naturalized from Eu.

3. **H. PRATENSE** Tausch. KING DEVIL.

A weed in situations and soils similar to the preceding; common. June–July 10.

Of more recent introduction than the last preceding species and lately becoming common about Ithaca, where it usually grows in company with that species.

Que. to s. N. Y. and Pa. Naturalized from Eu.

4. **H. FLORENTINUM** All. KING DEVIL.

A weed in more gravelly dry sterile soils than the preceding; rare. June–Aug.

Gravelly hillside pasture, n. e. corner of Butler Township, near Westbury Bog, 1916 (*L. H. MacDaniels & A. J. E.*). [Along railroad tracks at Little York, Cortland Co.]

E. Que. and Me., to Ont. and N. Y. Naturalized from Eu.

5. **H. venosum** L. RATTLESNAKE-WEED.

Dry open woodlands of oak and chestnut, in gravelly or sandy acid soils; frequent. June–July 10.

In the chestnut soils on the hills w., s., and s. e. of Ithaca, on the ravine crests and the crests of the lake cliffs, and in the sandy soils n. of Cayuga Lake; rare or absent in the McLean district and on the clays and richer soils back from the lake shores.

S. Me. to Man., southw. to Ga., Ky., and Nebr., including the Coastal Plain.

*6. **H. paniculatum** L.

Dry open woodlands and thickets, in gravelly, nearly neutral, sterile soils, *apparently preferring slightly less acid soil than the last preceding species; frequent.* Aug.–Sept. 10.

S. side of Enfield Glen; Six Mile Creek; Forest Home path; West Hill; Ringwood; hilltops s. of Dryden Lake; region of McLean Bogs; near Chicago Bog; s. side of Salmon Creek valley; and elsewhere.

N. S. and cent. Me. *to Mich., southw. to Ga. and Ala., including the northern* Coastal Plain.

7. **H. scabrum** Michx.

Dry open woodlands and banks, in sterile gravelly soils, without much reference to lime content; frequent. Aug.–Sept.

Generally distributed in oak and chestnut woods throughout the basin, and also in the maple and beech forests of the McLean district.

N. S. to Minn., southw. to Ga., Iowa, Nebr., and Kans., including the Coastal Plain.

8. **H. canadense** Michx.

Dry sandy or gravelly banks, in mostly sterile, neutral soils; infrequent. Aug.–Sept.

Around South Hill Marsh; n. of upper Coy Glen; Cascadilla woods (*D.*); bank of Fall Creek (*D.*!); Cayuga Heights; North Lansing; Waterloo; and probably elsewhere; apparently absent on both the chestnut soils and the more calcareous gravels of the McLean district. The factors governing the distribution of this species are not clearly known.

Lab. to B. C., southw. to N. J., Pa., Ind., Mich., S. Dak., and Oreg.

APPENDIX

PHYSICAL FEATURES OF THE BASIN

The local distribution of plants is greatly influenced by the physical features of the region, and a brief account of the physical characteristics of the Cayuga Lake Basin may not be out of place.

Cayuga Lake lies almost wholly within, but at the northern border of, the plateau region of New York. Its northern end extends slightly beyond the extreme northern edge of this plateau where the plateau joins the low, wide plain bordering Lake Ontario. The lake projects southward back into the plateau, and the hills on either side rise in altitude and steepness gradually from north to south. The business section of the city of Ithaca is located on an alluvial plain with delta base and flood-plain cover, in the deep valley which extends beyond the southern end of the lake. This extension of the lake valley, known as the Inlet Valley, continues southward from Ithaca for a distance of from 19 to 23 kilometers (12 to 14 miles) into the hills. While the northern part of the basin, comprising part of the Ontario plain to the north of the lake, is nearly level and has an altitude of only about 115 to 183 meters (380 to 600 feet), the southern part is very hilly and broken, and in places has an almost mountainous topography, the hills having been produced through dissection of the plateau by stream and glacial erosion. These hills attain a height of 639 meters (2095 feet), or 650 meters (2132 feet) on the eastern boundary. The surface of much of the northern part of the basin is scarcely above the ground-water level of that region, and is covered with very extensive and peculiar cattail marshes widely known as the Montezuma Marshes of New York. The altitude of these marshes is about 116 meters (380 feet) above tide. At the southern end of the lake there was originally a lesser development of the same type of marsh, but recently this has been partly eliminated by fillings from the dredging of the barge canal. In places along the lake, especially on the eastern shore, the banks are rocky and precipitous as a result of wave erosion and undercutting, the cliffs rising to the height of 30 meters (98 feet) in the vicinity of King Ferry. Where the larger streams flow into the lake, extensive gravelly "points" have formed on which many rare plants have become established. At the northern end of the basin, on the Ontario plain, is a series of low parallel interrupted ridges, or drumlins, composed largely of loam, sand, and gravel, or in some cases of clay, extending northward and southward. In fact, this part of the State is noted for its extensive drumlin topography.

There are many streams in the basin, and some of those toward the southern end of the lake are of considerable size. Of the larger ones the following may be mentioned: Salmon Creek, 32 kilometers (20 miles) in length; Fall Creek, 48 kilometers (30 miles) long; Cascadilla Creek, 16 kilometers (10 miles) long; Six Mile Creek, 32 kilometers (20 miles) long; Cayuga Inlet, 24 kilometers (15 miles) long; and Taughannock Creek, 24 kilometers (15 miles) long; also Buttermilk Creek, Newfield Creek, Butternut Creek, and Coy Glen Creek. In the upper part of their course these streams flow quietly through broad valleys, physically mature in form, but on approaching the lake they fall precipitously over series of cascades to lake level. This part of their course is through deep rocky ravines, and these ravines, because of their number and size, form one of the most characteristic and widely known features of the local topography. Toward the northern end of the lake the streams are small, Paine Creek and Big Gully Creek being the only ones worthy of mention. The outlet of the lake is at the north and enters Seneca River, which serves as the general outlet of most of the Finger Lakes. This river flows sluggishly through the Ontario

plain in a meandering fashion, and after receiving the Clyde River from the northwest finally joins the Oneida River to form the Oswego River, which empties into Lake Ontario at Oswego.

Cayuga Lake is 116 meters (381 feet) above tide. It is shallow at the northern end, but becomes gradually deeper until at a point three-fourths of the distance toward the southern end, in a region opposite Kidders, it is 132.6 meters (435 feet) deep, or 16.1 meters (53 feet) below sea level. Along most of the distance from Willets to Taughannock Point it is more than 122 meters (400 feet) deep, and a considerable depth is maintained even to within a short distance of the southern end. This great depth renders the lake very cold in summer, and suitable for bathing only in the shallow water at intervals along the shore. In winter the water is slow in cooling, and over most of the region south of the middle it usually remains open. There is a tradition that the lake freezes entirely over only once in about twenty years.

From Cayuga southward to a northeast-and-southwest line through Fleming, Aurora, and Ovid, the land is practically a continuation of the Ontario plain, rising very slightly toward the south but nearly free from drumlins. This region was apparently a glacial basin. At the line mentioned, the surface rises more quickly to form the lower, or central, plateau of the basin. This plateau has an average altitude of about 305 meters (1000 feet), sloping gently upward to the higher plateau and downward from the east or the west toward the lake. The higher plateau has a northern U-shaped escarpment extending from near Moravia southward to Dryden, westward to Ithaca, and northwestward into Enfield, Hector, and Lodi. It has an average altitude of about 518 to 579 meters (1700 to 1900 feet). West of the lake the transition from one plateau to the other is very gradual, and this is true also in the Moravia region. East of Ithaca, however, the transition is abrupt, and it is here represented by the line of hills extending from Turkey Hill eastward to Dryden. The lower plateau is level or gently rolling, with few dissecting valleys. Fertile fields, woodlands, and swampy areas alternate, but there are few contrasting topographical features. The higher plateau, on the contrary, is strongly dissected by stream valleys, the sides of which, especially those trending northward and southward, have been greatly steepened by ice erosion, thus giving rise to high hills with bold, steep, and sometimes rocky, declivities. Principal among the hills are Connecticut and Key Hills in the town of Newfield, the former being the highest hill in the basin; Thatcher Pinnacles and Ball Hill along the Inlet Valley in Danby; North and South Pinnacles and Bald Hill in Caroline; and Turkey Hill near the hamlet of Varna. On Thatcher and Caroline Pinnacles the steep valley faces terminate near the summit in cliffs on the crests of which several rare plants are found. The soil on these slopes is thin and the plant covering is undoubtedly modified by this condition. Where not eroded, the summits are usually flat, are covered with a thin glacial or rarely residual soil, and are often poorly drained. Local swampy places are thus formed, some of which, as South Hill Marsh, are of much interest botanically. Where better drained, the summits are under cultivation.

Perhaps the most interesting and characteristic topographical feature of the basin is the extent and degree of development of ravines. All of the hundred and more streams flowing down the sides of the lake valley have cut ravines of varying depth and breadth. The streams are bounded by perpendicular rocky walls alternating here and there with steep wooded slopes. In the larger ravines, such as Fall Creek, Cascadilla, Enfield, and Taughannock, the cliffs rise to a height of from 70 to 137 meters (230 to 450 feet). There are numerous cascades of various heights; one cascade in Taughannock Gorge, having a clear drop of 65.5 meters (215 feet), is perhaps the highest falls with uninterrupted drop in the United States east of the Rocky Mountains. Many rare plants are found in and around these gorges. The very numerous ravines and the much dissected plateau render the region about the head of Cayuga Lake extremely diversified and picturesque, the wild areas alternating with those devoted to cultivation.

SPRINGS

In many places throughout the basin, springs occur, and many of these are of considerable size. Since the water flowing from these springs frequently passes for a considerable distance through glacial drift, the springs are usually strongly calcareous, producing small marl meadows where the water flows away. The largest springs of this sort are found west of Newfield; at Spencer Lake; at Dryden Lake; at Mud Creek, Freeville; along Beaver Brook, Cortland ("Chicago" Springs); and about the marl ponds at Junius.

Thick strata of rock salt underlie central New York. At Syracuse the salt beds are near the surface, but they dip toward the south so that at Ithaca these same beds lie about 670 meters (2200 feet) below the level of the lake, or about 1042 meters (3420 feet) below the higher plateau to the southward. A number of salt wells have been sunk in the valley near the lake shore, and thriving salt factories are in operation in Ithaca, near Renwick, and on Myers Point. The escaping salt water has produced interesting local brackish marshes in which several saline plants have sprung up recently, though at a long distance from previously known stations. In the northern part of the basin, on the Ontario plain, several natural salt springs are found. Those in the vicinity of Montezuma were used by the Indians as a local source of salt and were known to early travelers. A deer lick also was located in this region. The salt water flowing from these springs has rendered the meadows and creeks in their vicinity decidedly brackish. A few miles farther west, near the road between the villages of Savannah and Spring Lake and directly west of Howland Island, is a small salt pond surrounded by a brackish meadow. South of this point, near the site of a former pond in the Montezuma Marshes known as Black Lake, and also on the shore of Cayuga Lake at a point opposite the village of Cayuga, are other smaller marshes containing salt. The effect of these springs on the vegetation is plainly evident locally, where the brackish marshes harbor many salt-loving plants common on the coast but rarely found inland. A more subtle effect is produced by these springs, and probably also by other smaller or submerged salt springs, on the general vegetation of the marshes on the Ontario plain and in the lake valley, where the occasional presence of brackish-marsh or coastal plants suggests a trace of salt, though a trace too small to be otherwise detected.

At a point a short distance north of Ledyard is a large sulphur spring, and other smaller springs containing sulphur are found in Six Mile Creek ravine and Enfield Glen. The sulphur springs seem to have produced no effect upon the flora.

Many of the springs through the basin are impregnated with salts of reputed medicinal value, and near these, in the early days, sanatoriums were located. Noted establishments of this sort were at Slaterville Springs, Dryden Springs, and Union Springs. These springs seem to have had no effect on the vegetation.

BOG FORMATIONS

Crossing the lake basin and in general comprising its southern limit is a glacial moraine of notable development. Although inconspicuous where it crosses the uplands between valleys, it gives rise on the valley floors to very characteristic "tumbled-up" morainic topography of the knob-and-kettle type, with numerous interspersed bogs and small ponds. The moraine crosses the Inlet Valley from west to east at the source of the inlet drainage, and swings off across the divide, turning toward the northeast. It is not so markedly developed in the Six Mile Creek valley, though it does show conspicuous ridges at White Church and northward. In the Slaterville valley it is massive, but is obscured by gravel fill on the east. It reappears near Dryden Lake and is well developed in the Freeville and McLean regions, again reappearing outside the limits of this flora in northern Cortland County.

In the morainic region just mentioned, as well as among the drumlins on the

Ontario plain, many peat bogs and small ponds have formed, generally through the damming of drainage valleys or the formation of undrained pockets due to the irregular accumulation of glacial débris; or in some cases by the slumping-off of débris from the various sides of an ice block, causing the formation of a ridge around a central pond. Thus, on the watershed of the Inlet Valley are found Spencer Lake and Summit Marsh; near the source of Buttermilk Creek are Michigan Hollow Swamp and the Danby Fir Tree Swamp; in the Six Mile Creek valley are Slaterville Swamp and minor boggy places in the hills east and north of Slaterville; and in Cascadilla Valley is Ellis Hollow Swamp. Several of these swamps are apparently flat overflow areas of the glacial drainage. In the hills north of the Ellis Hollow valley is the Ringwood Swamp region, the result of irregular glacial dumping. Bogs of the same origin, but developed on a larger scale, are found in the Freeville-McLean region, which therefore is one of the most noted botanical collecting grounds in the basin. Here are found Dryden Lake and adjoining bogs, Woodwardia Bog, Freeville Bog, Fir Tree Swamp, Malloryville Bog, McLean Bogs, Beaver Brook swamps, Chicago Bog, Cortland marl ponds, and several miles farther north, near the source of Fall Creek, Lake Como (Locke Pond). In the valley south of the lake, boggy areas are scattered from North Spencer to Ithaca. The largest of these are Larch Meadow and Fleming Meadow, which in recent years have lost much of their earlier interest through drainage.

Along the lake shore the topography is not adapted to bog formation, but beyond the northern end of the lake the low flat land intersected by drumlins is particularly suited to bogs and marshes. On the Ontario plain, at the western edge of the basin and lying almost beyond its borders, are the Junius bogs, one of the most interesting bog regions in central New York. The Junius bogs lie about six miles north of Geneva, in a sandy area partly, at least, of morainic origin. There are in this locality three or four extensive acid bogs, the southernmost of which contains a small open pond, locally known as Pout Pond, surrounded by a floating heath. North of these bogs and separated from them by a highway is a series of small marl ponds bordered by extensive quaking marl bogs. Several of the rarest plants in the flora, and many others of exceptional occurrence, are found here, and for this reason, and also because of the general richness of the local flora, the whole region is of the greatest interest to the botanist. The Junius ponds afford an unusual opportunity for contrasting side by side the floras of acid and calcareous bogs. Farther north, in the township of Savannah, is an extensive tamarack swamp two or three miles in length bordering Crusoe Lake. Eastward from there, in the township of Conquest, is Duck Lake, the center of an extensive bog region in which tamarack and spruce usually render passage difficult, while arbor vitae forms dense thickets along the borders. Here are Miller Bog, the Duck Lake bogs, Featherbed Bog, and the bog surrounding Mud Pond. On the extreme northern edge of the region and almost beyond the limits of this flora is Westbury Bog, located in the northeastern corner of the township of Butler. These bogs in the northern section of the basin have furnished a number of species not reported in Dudley's *Flora*. Southeast of Duck Lake is Slayton Pond, a small and very muddy pool of water surrounded by an extreme development of floating moor which is composed mainly of Decodon and sedges and on which walking is nearly or quite impossible.

UNDERLYING ROCKS

In many regions the soils are dependent largely or entirely on the character of the rocks found beneath the surface. In the Cayuga Lake Basin, however, the soils are almost entirely glacial, or more rarely are due to stream action. Nevertheless the material of which the glacial drift is composed seems in many cases not to have been transported to a great distance, and hence the underlying rocks often have an indirect relation to the soil. It therefore seems desirable to include here a few words descrip-

tive of the rocks, in order that the reader may have a general understanding of the conditions in the basin.

The rocks underlying all of the Cayuga Lake Basin are unaltered stratified sediments belonging to the Devonian and Silurian systems. They consist of alternating layers of sandstone and noncalcareous shales, the latter predominating, and hence they are comprised of some layers of hard flagstone with much soft, friable shale between. There are included also, especially in the Silurian system, certain layers of limestone and a considerable amount of calcareous shale. To the horizontality of position and the alternation in hard and soft layers, much of the peculiar character of the ravines and their cataracts is due. The strata have a low and very uniform dip toward the south, about three feet to the mile on the average though locally much increased or even reversed in direction. This fact, combined with the general slope of the surface topography toward the north, results in the exposure of lower geological formations at the northern end of the basin. At the extreme northern end, on the Ontario plain, the rocks are of the Upper Silurian system, in which limestones and calcareous sandstones and shales predominate. The rocks of the plateau region from Cayuga village southward are all of the Devonian age, and in their lower strata, outcropping near the northern end of the lake, limestones, calcareous sandstones, and calcareous shales also form a prominent feature. These layers at the north, outcropping across the country eastward and westward, are exposed southward only as a narrow band on each side of the lake valley to within a few miles of the city of Ithaca. The rocks farther south represent higher strata in the Devonian system, and are chiefly noncalcareous sandstones and arenaceous shales.

PHYSIOGRAPHIC HISTORY

Plant distribution in the Cayuga Lake Basin, through its relation to soils and topography, is indirectly related not only to the underlying rocks of central New York, but also to the general physiographic history of the region, on which the topography and soils depend. The material constituting the rocks of central New York was deposited as marine sediments in the Paleozoic sea which stretched westward and southward from the ancient Appalachian land mass of the east and north, now in part subsided below sea level. At the end of the Paleozoic era the central New York area was uplifted to a very considerable altitude. Tarr thinks that the subsequent denudation, bringing the upper plateau to the present level, has been equal probably to the present maximum height above sea level, or about 640 meters (2100 feet).[39] The uplift was probably intermittent, but the deformation was not great, as is shown by the present nearly horizontal position of the strata. From the summits of the higher hills it is immediately perceived that the tops of all the hills are at the same general level and constitute a plain or a plateau into which the valleys have been carved. The surface of the plain so reconstructed is therefore an old erosion surface. The slope of the land toward the north has been assumed to indicate that a large part of the drainage of the uplands was preglacially, as now, in that direction, possibly along the axes of Seneca and Cayuga Lakes. The plain-like character of large stretches of the upper plateau and again of the lower plateau is probably due to wide areas of resistant underlying rock strata at different levels. The denudation following the first uplift apparently continued until the whole region was reduced to sea level, producing the erosion plain of the upper plateau mentioned above and now represented by the level surfaces of the higher summits. Another uplift, giving rise to the present elevations, followed. After that, stream erosion once again carved broad, mature valleys, now represented by the wide upper courses of the larger streams, especially those with an east-west direction.

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[39] Tarr, Ralph S. Physiographic record, p. 213. U. S. Geol. Survey. Geologic atlas of the United States, Folio 169, Field ed.

Following the last erosion period, just mentioned, the region was invaded at least once, and very probably twice, by continental glaciers. The first glacial ice sheet overrode the country completely, coming down from the north. The original north-and-south valleys were dammed by the ice, and the water flowed over in many places into the Susquehanna Basin at the south. Eventually the ice flowed also over the divide, and by its erosive action it developed the through valleys which are a characteristic feature of the present divide between the Finger Lakes and the Susquehanna Basin, and by its scouring action it also greatly broadened and deepened these valleys. The scouring action of the ice was most extreme in the Cayuga Lake Valley, where the entire valley depression was deepened to such an extent that the bottom in the deepest part is now 16.5 meters (54 feet) below sea level. When the ice had gone, hanging valleys were left along the hillsides of Cayuga and Seneca Lakes due to the deepening and broadening of the north-and-south channels which left the old preglacial tributary valleys high in the air where they joined the north-and-south valley. Postglacial gorges were then cut by streams flowing down the steep hillsides from these hanging valleys. After a long interval, during which the climate seems to have been more genial than the present one, a second ice sheet covered the region, continuing the work begun by the first ice sheet but evidently doing little more than sharpen the effects produced by the first invasion. The gorges cut during the interglacial period were filled with morainic and outwash deposits, and, on the recession of the ice, new gorges began to form in new channels, and this erosion is still in progress. These new gorges constitute the present extensive system of ravines for which central New York is famous. As the ice retreated, a glacial lake was formed between the ice front and the divide over which the water drained to the southward. An overflow channel along which the water drained from the glacial lake at the head of the Cayuga Basin into the Susquehanna Valley can be readily seen at Spencer Lake, and another at Wilseyville. The occurrence of some Ontario-plain and Coastal-Plain plants on the Spencer divide suggests a possible relation to the fact that through this channel the water of the glacial lake occupying the southern part of the Ontario plain drained away. Could this drainage water have affected the soils of the Ontario plain and the Spencer divide similarly?

The level of the glacial lake in front of the ice mass was reduced at irregular intervals, the lake standing at successively lower levels as new outlets were uncovered. This is shown by the occurrence of terraces at various heights on the hillsides bordering the Inlet Valley. These terraces are especially well marked near the ravines, where material was deposited as deltas from the outflowing streams, as at Coy, Buttermilk, and Enfield Glens, and they are also obscurely developed here and there as old beach lines.

The activity of the latest glacier as a transporting and erosive agency, and the action of glacial outflow streams in connection with the presence of high-level glacial lakes, have been the chief factors in the formation of the present soils throughout the basin. More recently there have also been notable accumulations of colluvial, alluvial, and fluvial soil materials due to the activities of the modern drainage.

SOILS OF THE CAYUGA LAKE BASIN, AND THEIR RELATION TO THE PLANTS OF THE REGION

The effect of the chemical and physical nature of the soil on the distribution of plants, though long noticed in its rougher details, has not been worked out to a condition approaching exactness. Such factors as texture, chemical composition, water content, bacterial flora, and the quantity of organic matter present, are of undoubted importance, but the exact values of these factors are at present only imperfectly understood. It has been found, however, that few, if any, chemical elements other than calcium, sodium, carbon, and nitrogen, produce an appreciable effect on the distribution of plants. The flora of calcareous regions and that of

noncalcareous regions are strikingly different, and many plants are distinctly calciphiles or calciphobes. Likewise, the flora of the salt or the brackish marsh is very different from that of ordinary nonsaline regions. Organic matter is important, especially when in the form of peat in peat bogs but also as humus or leaf mold since there are many so-called "humus plants." Peat and humus seem to be greatly influenced by the degree of acidity of the soil as well as by other factors. The formation of peat generally requires acid conditions, but leaf mold appears to be deepest over calcareous soils. The water and the air content of the soil are important. They are often dependent on drainage, which in turn is very often related to soil texture. In general, gravelly and sandy soils do not support the same vegetation as does clay. The interrelation of the various factors is often very complex and their effect may be very indirect. The reader is referred to the writings of Fritz Unger, Anton Kerner von Marilaum, Contejean, Hilgard, Fernald, Tansley, Coville, and Wherry, for further information regarding the importance of lime in plant distribution.

The soils of the Cayuga Lake Basin, except those in Seneca County, have been surveyed by the Bureau of Soils of the United States Department of Agriculture in cooperation with the Cornell University Agricultural Experiment Station. For details of soil distribution, the reader is referred to the bulletins published by that bureau.[40]

The soils of the Cayuga Lake Basin are largely of glacial origin, though stream deltas and alluvial deposits constitute a small proportion. On the hills at the southern end of the basin the glacial drift is thin and the soils are correspondingly shallow, and on the flat plateau summits, as well as in the draws, they are often poorly drained. The underlying rocks are Devonian noncalcareous sandstones and shales. These rocks are the chief source of the overlying soil, much of which is noncalcareous, giving an acid reaction. These plateau soils at the surface are rather light in texture and are filled with angular fragments of stone, and the surface is often thickly strewn with these fragments. Judging from the plant covering, however, these soils are not uniform, for in some localities the forest is composed largely of chestnut with dyer's and scarlet or chestnut oak, and in the early days white pine, while in other localities it is largely made up of sugar maple, beech, and yellow birch, with chestnut and the above-named oaks absent. The associations of trees just mentioned represent two very distinct and contrasting types of forest in the Cayuga Lake Basin, each with its own association of undershrubs and herbs. On the higher plateau the oak-chestnut type is dominant in the south and the southwest, but many small islands of the maple association are scattered about, these becoming larger and more numerous toward Dryden, and from the McLean region eastward into Cortland County almost entirely replacing the chestnut and oak. The undergrowth in the oak-chestnut forest is chiefly of ericaceous plants, Desmodiums, Lespedezas, and the like, whereas in the maple-beech forest a conspicuous growth of herbaceous spring humus plants and a corresponding lack of plants during the summer are characteristic. In this maple-beech forest there is an almost complete absence of ericaceous plants, Desmodiums, and Lespedezas. The leaf mold is generally deeper in this type of wood, and the shade is much denser, two factors which largely determine the extensive development of the spring herbaceous flora on the forest floor of this type of forest, and its lesser development on that of the oak-chestnut type. The contrast between these two types of forest is altogether striking, but the factor or factors determining their occurrence are apparently not known and the problem is an exceedingly interesting one. It would seem that some difference

[40] Soil survey of Cortland County.
Soil survey of Tompkins County. (1924 ed.)
Soil survey of Cayuga County. (In press.)
Soil survey of Auburn District.
Soil survey of Wayne County.

in the soil must be the determining factor, as other environmental factors sometimes are uniform over both types of forest or sometimes seem to fluctuate without reference to them.

On the lower-level plateau north of Ithaca the soils are more diversified, being derived from drift of differing compositions or from lake sediments. The drift in the region from Union Springs southward to Ludlowville is rather clearly calcareous, as is much of that up the Fall Creek valley about Freeville and McLean, and to some extent that on the west side of the lake. In the Freeville region the assorted drift is calcareous while the unassorted drift generally is noncalcareous or of neutral reaction. The soils on this plateau are often poorly drained, and swamps and bogs have formed in the pockets. In general these soils support a maple-birch-beech forest, but where the drainage is poor the forest contains much red and silver maple, elm, basswood, and hickory, with some white oak and sour gum. Tulip and cucumber trees are scattered over the region. The undergrowth includes much Cornus (chiefly *C. candidissima*) and Rubus, and many spring humus plants. Soils transitional to those of the higher plateau are found over considerable areas along the Fall Creek valley. A part of the lower plateau is covered with a sedimentary soil of lake origin, since in the still water of ponds and lakes around the margins of the glaciers a fine sediment was deposited which now forms extensive clay and clay-loam deposits over large tracts. These heavy clay soils are best developed along the east side of Cayuga Lake from Myers southward, in an area which is narrow at the north but broadens markedly at the latitude of Ithaca. Most of the college farm is included, and the area extends east to a point beyond Varna, up the bottom of Six Mile Creek valley north of Brookton, and up the northeast flank of South Hill. Extensive areas of such soils occur also on the west side of the lake and in the Inlet Valley to West Danby or beyond. Other small areas are found near Newfield, Waterburg, Danby, and Freeville, and on the Ontario plain. The forest on this heavy soil contains much white and red oak, hickory, and American elm, and some basswood. Some herbaceous plants, as *Aster paniculatus* and *Solidago canadensis*, var. *Hargeri*, seem to be confined to this soil and may prove to be good clay indicators. However, a definite study of the flora of the clay soils has not yet been made.

From the region of Esty northward there is an outcrop of limestone along the lake cliffs and in the ravines on both sides of the lake. This gives rise to intermittent areas of limestone cliffs and talus which support many calcicolous plants. The limestone strata outcrop also here and there in a zone from Union Springs eastward. Over this latter area the rocks were scoured off by the glacier, and probably were an important source of the lime element in the glacial soils immediately to the southward. In this scoured region the effect of the limestone on the vegetation is not so marked as is that of the lime brought out in solution in the various marl springs of the basin.

Not all of the soil along the lake shore northward is limy talus, however. A not inconsiderable amount of clay soil is found, while north of Aurora there is a curious mixture of light and heavy soil with sandy points jutting into the lake. Due to some factor not yet understood, these soils support a very interesting assemblage of rare plants especially in the region from Aurora to Cayuga. On the crests of the lake cliffs, but more especially on the crests of the ravine banks either about Ithaca or northward, any lime that was originally in the soil has generally leached out, and the soil has become acid and supports the chestnut-vaccinium type of vegetation.

The section of the Ontario plain from Union Springs and Ovid to Cayuga seems to have been, in part at least, a glacial basin or drainage area, and is covered with alternating areas of sedimentary clays and lighter gravelly soils all of which are generally calcareous. Farther north, where the drumlins occur, the soil is generally of the lighter type and calcareous, though no distinctly sandy areas are found except in the vicinity of Junius. In the last-named region, however, the soil is very sandy,

with an occasional sand "blow-out," and supports a noncalcareous flora. In the general drumlin area a few lake-bottom soil deposits are found, and a considerable quantity of muck and peat. The most extensive muck deposits are in the Montezuma Marshes, where they are many miles in extent. These marshes are underlaid, in part at least, by a layer of marl.

On the lowland in the Inlet Valley, the Salmon Creek valley, the Ellis Hollow valley, and in patches about Freeville, are found rich alluvial soils containing much organic matter and some lime. It is on these soils that a majority of the plants of western affinity in the basin are located. Whether these western plants are localized in the lake valley because of the soil or on account of other factors has not been determined. The similarity of these rich soils to those in the Ohio and Mississippi Valleys is suggestive, however.

At the mouth of the ravines, and in many cases where the streams enter the lake, gravelly deltas have been laid down. Gravel bars are frequent also along the stream beds. On the lake shore the gravel thus deposited forms "points" jutting out into the lake. On this gravelly soil many rare plants are found.

Local but extreme types of soil, due to local conditions, are found here and there in the basin. The occurrence of numerous highly calcareous springs has already been noted, and also the occurrence of marl areas which are frequently formed where the springs discharge. Such areas usually exhibit a strongly calciphilous flora. At Junius and South Cortland more extended marl lakes and bogs occur, the marl being apparently deposited largely through the action of the alga Chara. In certain depressions in which the water is not calcareous, peat bogs have formed which are distinctly acid in reaction, and in these bogs a wholly different flora is found. The occurrence and location of these bogs has already been noted. The bogs are inhabited largely by ericaceous plants, orchids, and special sedges and grasses, all of which are adapted for life in a highly organic acid soil deficient in mineral matter and nitrogen. The so-called peat moss, Sphagnum, is an important and abundant component of the bog flora, and insectivorous plants are not unusual. Underlying the living vegetation of these bogs is a thick layer of peat formed by the partly decomposed plant remains. These bogs were in most cases originally small open bodies of water, some of them noncalcareous, others calcareous. In some cases they were small marl ponds over which the acid peat began to form through some change not clearly understood.[41] This was the history of some of the bogs at McLean. More generally the ponds seem to have been noncalcareous from the start. Certain characteristic plants, of which *Chamaedaphne calyculata* was the principal one, began to grow slowly out from the edges of the pond over the surface, forming a floating mat of vegetation. The continued growth of the mat, accompanied by the disintegration of its older parts underneath, gradually filled up the ponds, and through the action of various factors the ponds changed into muck land. This has already been the history of many bogs. At the muck stage the soil often shows a change to a less acid or even a neutral reaction. Marl bogs show the same general history, except that, instead of Chamaedaphne, the invading plants are generally sedges, particularly *Carex lasiocarpa*. The marl-bog moor is usually a sedge-and-grass moor, and not predominantly ericaceous as is the peat moor. These bog floras are more distinctive than any other special floras in the basin.

The more recent soil surveys of the basin have subdivided the types of soils, and the areas have been very carefully mapped. There is much need now of a careful correlation of the species of wild plants with these details of soil distribution.

In general, it may be said that the soils of the Cayuga Lake Basin support a calcareous- or a neutral-soil flora. Only in the oak-chestnut soils of the hills, in the sands of Junius, on the ravine crests, and in the peat bogs, does a distinctly

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[41] Relation of marl ponds and peat bogs. By W. W. Rowlee. Brooklyn Bot. Gard. Mem. 1:410–414. 1918.

acid-soil flora appear. The average percentages of CaO in certain soils of the basin, as determined by analyses made by soil specialists, are as follows:

	Per cent of CaO in surface soil	Per cent of CaO in subsoil
Acid soils:		
Chestnut soils of the hills	0.3674	0.0911
Calcareous soils:		
Soils from Esty to King Ferry	0.9104	3.2454
Drumlin region, Ontario plain	1.2318	3.8555

Though a detailed account of the relation of local soils to the vegetation must be left to some future time, it was thought that some interesting generalizations might be discovered by a study of the soil requirements of the rare plants listed in the unpublished table mentioned on page 452. Those plants of the table not inhabiting the peat and marl bogs were divided into two groups, those of dry and those of wet soils. The species of each of these groups were then further classified, as accurately as was possible considering the dearth of actual measurements of acidity, under the following headings: calcareous, acid, neutral, rich, and saline. Each of these divisions was then subdivided into light, undefined, and heavy. Among rich soils were included those soils of alluvial origin or with abundant organic matter. Rock plants were classified under "light soils." Under the designation "coastal" were included plants primarily of Atlantic Coastal Plain distribution. The term "central" was employed for plants whose center of distribution is in or near New York State.

As a result of this study, it was found that on wet nonboggy soils the distribution was as follows: light calcareous 17, calcareous (undefined texture) 61, heavy calcareous 0; light acid 12, acid (undefined texture) 18, heavy acid 0; light neutral 11, neutral (undefined texture) 8, heavy neutral 0; light rich 0, rich (undefined texture) 8, heavy rich 0; light saline 3, saline (undefined texture) 17, heavy saline 0. The totals for wet nonboggy soils were: light soils 43, soils of undefined texture 112, heavy soils 0. From a different standpoint the totals were: calcareous 78, acid 30, neutral 19, rich 8, saline 20. Of the 78 wet-calcareous-soil plants in the list, 27 were northern, 19 central, 13 western, 11 southern, 2 Coastal Plain, 3 Appalachian, and 3 of general saline distribution. Of the 30 acid-soil plants, 13 were central, 6 northern, 5 coastal, 4 southern, 2 Appalachian, and none western. The plants of neutral wet soil were about equally northern, southern, coastal, and central; those of rich wet soil were mostly central and western. From these figures it appears that a majority of the rare, and hence presumably distinctive, wet-soil plants of the basin inhabit calcareous soils, and, for the most part, soils of medium and light texture. Comparatively few are of distinctly rich soils, and none can be considered to inhabit noticeably heavy soil. The texture of wet soil is difficult to make out. Most of those listed as "undefined" are probably of medium texture.

A similar tabulation of the rare plants of dry soils gave the following figures: light calcareous 35, calcareous (undefined texture) 10, heavy calcareous 0; light acid 83, acid (undefined texture) 4, heavy acid 2; light neutral 45, neutral (undefined texture) 6, heavy neutral 5; light rich 13, rich (undefined texture) 31, heavy rich 0. Here again most of the items classified as "undefined texture" are medium. The totals for dry soils were: light soils 176, soils of undefined texture 51, heavy soils 7; or, from a different viewpoint, calcareous 45, acid 89, neutral 56, rich 44, saline 0. Of the 45 dry-soil plants of calcareous soils, 17 were western, 10 northern, 10 central, 5 southern, 2 Appalachian, and 1 coastal. Of the 89 found in acid soils, 30 were central, 29 southern, 14 northern, 7 coastal, 5 western, and 4 Appalachian. Of the 56 plants of neutral soils, 23 were southern, 15 central, 6 northern, 6 western, 5 Appalachian, and 1 coastal. Of the 44 plants of rich soils, 27 were western, 9 central, 4 southern, and 4 northern. Here, contrary to the conditions found among the wet-soil plants, the great majority occur in light soils and a large proportion inhabit acid soils. The grand total of both wet and dry soils showed: light soils

219, soils of undefined texture, mostly medium, 163, heavy soils 7. This striking preponderance of light-soil plants over heavy-soil plants was unexpected. However, it accords fairly well with experience, in that better botanizing, as far as the number of rare plants is concerned, is found on gravel and sand than on clay, especially in dry soils. The preference of plants of the different geographical affinities for particular soils is interesting and was not wholly expected.

Though the relation between soils and native plants is a subject yet too poorly understood to allow much detailed information in this work, a very serious attempt has been made to include under each species in the text as much knowledge as could be obtained regarding its specific requirements. Also, under the range of each species the fact of its occurrence or its absence on the Atlantic Coastal Plain has been noted. Since the plants of that region so generally inhabit light sandy acid soils, the occurrence or the nonoccurrence of a species there often throws light on its soil requirements. Investigation of the soil relations of the native plants is urgently needed and can scarcely fail to furnish important information for the plant geographer. Even more important will be the information furnished the agronomist, for it has been shown that in many cases the wild plants are more sensitive to small differences in composition of the soil than are chemical and physical analyses, and hence the data so obtained should be useful in supplementing those obtained in the usual way.

CLIMATE

The effect of climate on the distribution of plants in the Cayuga Lake Basin has not been thoroughly studied. Probably the climate is a more potent factor here than it usually is elsewhere in an area of equal size, except in mountainous regions, as there is a not inconsiderable diversity of altitude and a marked local effect of the lake water. In general, the basin lies in the Transition Life Zone, but a distinct Austral element is found in the lake valley, and a small Canadian element on the hills, in the McLean region, and on the northward-facing slopes of the ravines.

The Cayuga Lake Basin lies in the general forest belt of the eastern United States, and has an average yearly rainfall of about 85 centimeters (33.4 inches). The yearly average temperature for Ithaca is about 47° F., and for the McLean region approximately 45° F. The average monthly temperatures for Ithaca, in degrees Fahrenheit, are:

January	24.5°	May	57.1°	September	61.8°
February	24.1°	June	66.0°	October	51.0°
March	32.4°	July	70.6°	November	39.0°
April	44.9°	August	68.2°	December	28.7°

The average date of the last killing frost in the spring, at Ithaca, is May 10, and that of the first killing frost in the fall is October 10. The lowest temperature reached during a period of forty-six years is -22° F., and the highest is 102° F.

As factors of the general topography which affect plant distribution, the lake and the hills are important. The influence of the great depth of the lake on the temperature of the water has been mentioned. The lake is colder in early summer, and warmer in late autumn, than a shallow body of water. That some modification of the air temperature should be caused by this condition is to be expected, and such is the case. The temperature of the lake unquestionably influences the development of the vegetation in its immediate vicinity. As Dudley has stated, plants on its shores usually develop a week or more later in spring than they do in the neighboring ravines and warm valleys around Ithaca. During the first half of November the blue flowers of *Aster laevis* and the white panicles of *Aster sagittifolius* still remain in considerable abundance along the lake shore, long after those near Ithaca have matured and faded. The effect of the lake can at times be detected by the presence of a cloud bank on the side of the valley away from the

source of the wind. On favorable quiet summer nights, a slight land breeze blowing toward the lake is often noticed. As a result of the modifying effect of the lake, peaches may be grown along its shores though they are not hardy in the region farther back toward the hills. The effect of the lake on the summer temperature is not so marked, though the air is often distinctly cooler close to the lake along the eastern shore, where the prevailing winds have blown across the water. In the valley south of the lake, however, the temperature is generally higher than in the surrounding hills, due to retarded change of air incident to the high hills on either side, and possibly also to retarded radiation. Garden crops can be started earlier, and will mature sooner, in this region than near the lake or back on the hills. The fact has been noted that many southern plants inhabit the lake valley. Whether this is due to any modifying action of the lake, or solely to the depth and protected condition of the valley, is uncertain. The greater warmth of the lake valley is often made graphic by the snow line on the valley slopes. Frequently during the winter the snow remains on the ground on the higher hills, while toward the valley floor it has melted away. The winter snows are deeper on the hills, and especially in the McLean region and eastward into Cortland County, than about Ithaca. All this indicates a slightly cooler climate back from the lake, and explains the occurrence of some plants of the Canadian Life Zone on the hills and in the McLean region.[42]

THE FOREST COVERING

The basin of Cayuga Lake lies in a highly developed agricultural region which has been under settlement since 1789, when the first white man established a home in this region. Extensive farm land now alternates with woodlots which on the steep slopes and about the ravines are often still extensive though of second- or third-growth timber. Since the lake basin lies in the Appalachian forest belt, it is natural to expect the climax vegetation of all or of a greater part to be the forest, and such is apparently the case. Before the advent of the white man the region was in the main densely forested. Few records exist from which the primitive flora may be judged, and these Dudley has brought together in such excellent form that his account may be quoted at length:[43]

"That the basin of Cayuga Lake was originally densely forested over three-fourths of its area, there can be little doubt. It also seems clear that the Cayuga tribe of Indians who were either occupants or overlords of all the territory within, and far south of our limits, had many cleared fields at the time of the arrival on the shores of our lake, of the Jesuits, Father Joseph Chaumonot and Father René Ménard, in Aug. 1656. Although they dwelt among the Indians until the remarkable flight of all the missionaries in Mar. 1657, before the supposed conspiracy of the League; and although they wrote voluminous letters of their life, their trials, their hopes and their failures, there is scarcely a word upon the aspect of the natural world which surrounded them. The mission at Cayuga was restored in 1668, and Stephen de Carheil remained there till 1684, when he was driven out by two Cayuga chiefs.

[42] The effect of climate on plant and animal distribution in the basin has been discussed, not only by Dudley in the *Cayuga Flora*, but also by Reed and Wright and by Allen, in the publications cited below. The soil survey bulletins, mentioned elsewhere, contain brief accounts of climate; more extended accounts are found in the articles by Wilson and Turner cited below.

Reed, Hugh D., and Wright, Albert H. The vertebrates of the Cayuga Lake Basin, N. Y. Amer. Philosoph. Soc. Proc. 48:370–459. 1909.

Allen, Arthur A. The red-winged blackbird: a study in the ecology of a cat-tail marsh. Linn. Soc. New York. Proc. (Abstr.), nos. 24–25(1911–13):43–128. 1914.

Wilson, W. M. The night winds of Lake Cayuga. U. S. Agr. Dept. Climatological Service of the Weather Bureau, New York Section. Report for August, 1906, p. 59.

Turner, E. T. The central lake region. *In* The climate of New York State. New York Weather Bureau. Ann. rept. 8(1896): 440–441. (Also in New York State Assembly Documents, vol. 25, 1897.) 1897.

[43] The Cayuga Flora, page xix. By William R. Dudley.

Still we should know nothing of the region had not a Jesuit, Father Raffeix, who evidently had an observant mind, taken de Carheil's place, during a temporary absence of the latter. He was a man of wide experience and had visited the other tribes of the League in their own homes. He writes in the *Relations* for the year 1671–72, (Quebec Ed. p. 22): 'Cayuga is the most beautiful country I have seen in America. It is situated in latitude 42½, and the needle dips scarcely more than ten degrees. It is a country situated between two lakes and is no more than four leagues wide, with almost continuous plains bordered by beautiful forests. Agnie, (the country of the Mohawks), is a valley very narrow, often very stony, and always covered with fog; the hills which enclose it seems to me to be very poor land. Oneida and Onondaga, as well as Seneca, appear too rough and too little adapted to the chase. Every year in the vicinity of Cayuga more than a thousand deer are killed. Four leagues distant from here, on the brink of the river (Seneca outlet) are eight or ten fine salt fountains, in a small space. It is there that numbers of nets are spread for pigeons, and from seven to eight hundred are often taken at a single stroke of the net. Lake Tiohero, one of the two which join our canton, is fully fourteen leagues long and one or two broad. It abounds in swan and geese all winter, and in the spring one sees a continuous cloud of all sorts of game. The river which rises in the lake, soon divides into different channels enclosed by prairies, with here and there fine and attractive bays of considerable extent, excellent places for hunting.' It is not difficult to picture to one's self the country here described. The marshes were as they are now, while all the country about, used by the Indians for the purpose of deer-stalking, was made up of 'continuous plains' (the 'oak-openings') bordered by the forest. The openings were kept clear by the Indians, by annually burning them over. These openings were described by President Dwight in his tour through Western New York, 1822. Greenhalgh in his Journey 'from Albany to ye Indians westward,' 1677, says of the Cayugas: 'they have abundance of corne,' which implies of course cleared fields near their villages, at the foot of Cayuga Lake. But the universal testimony is that the forests became very much denser and more tangled near the head of the lake and throughout the country south. The Cayugas made frequent excursions through this country southward to the Susquehanna, and they are spoken of in Hiawatha's decrees as the people whose 'habitation was the dark forest,' their country being much more densely wooded than Onondaga. John Bartram, a Pennsylvania Quaker and most excellent botanist, a keen observer and the most delightful of letter-writers, made a journey to Onondaga in 1743, passing up the Susquehanna to Owego Creek. He then passed through the forest probably traversing the east part of Tompkins Co., and the western part of Cortland Co. He at first passed 'over fine, level, rich land' with 'oak, birch, beech, ash, spruce, linden, elm, hepatica, and maidenhair in abundance.' Then he struck 'swampy land, then thickets, and on the hills, spruce and white pine.' Reaching level ground—perhaps near the present site of Cortland—he found it 'full of tall timber of sugar-maple, birch, linden, ash, beech, and shrubs of opulus, green-maple, hornbeam, hamamelis, Solanum, gooseberries and red currants.' He describes the tops of the trees as so thick and interlacing that it is 'impossible to see which way the wind drives or the clouds set.' He next reached the dividing ridge where he found chestnut and cherry in addition to the other trees; and toward Onondaga they found many 'oaks, hickories, plums and apple-trees full of fruit.'

"This corresponds well with the present distribution of species, so far as the hardwoods are concerned. From Dr. Parker and other residents of Ithaca, whose recollections reach back to 1830 or 1835, we know that the tracts of white-pine now wholly cleared away, were extensive and well-defined. There was a heavy growth of it in Enfield stretching up for a long distance between the lakes. It descended into the Neguæna valley near Buttermilk Falls, covered the top of South Hill, extended back in several well defined tracts through Danby and Newfield and occupied portions of Neguæna and other valleys. The pine was particularly heavy about

Summit Marsh. There were also large tracts in the upper part of Cascadilla valley, on Turkey Hill, and the pine-land extended north in narrow belts from this region, penetrating the tracts of elm and maple of that region. About Ithaca on the hills were 'openings' of oak and hickory and on both shores of the lake, these with other hardwoods prevailed. In the valley near Ithaca, near Buttermilk Falls, and on both shores of the lake there were apple-orchards, and cleared fields, cultivated by the Indians. On the bank near the Fleming schoolhouse was an Indian town called Coreorganel, destroyed by Sullivan's army in 1779, and about the site Indian apple-trees existed down to a comparatively recent date. Although the Moravian missionaries, and particularly Bishop David Zeisberger, traversed this valley not infrequently, as early as 1750, it was not settled by white men till 1789, so that all the changes in vegetation which have taken place have come about in less than a century."

The condition now is not greatly different from that described by Dudley. The primitive forest has all been cleared away except one or two very small areas containing a few trees each. Roughly stated, the general composition of the present forest is as follows: On the hills at the southern and southeastern end of the basin two contrasting types of forest are found, each with its own typical undergrowth of shrubs and herbs. One of these types consists principally of beech, yellow birch, and sugar maple, the other of chestnut, dyer's oak, and scarlet oak. These two types often alternate over rather small areas. South of Ithaca the chestnut-oak forest predominates, while in the McLean region the beech-maple alone is found. The dense stand of white pine, which was for the most part coincident with the distribution of the chestnut-oak forest, was largely cleared away before Dudley's time, and now, in general, only scattered trees of second or third growth are left. At present the stump fences constructed from white pine stumps are the best indication of the former range, which is given in the foregoing quotation from Dudley. A beautiful tract of the primitive white pine forest, about ten acres in extent, was preserved in the valley at North Spencer until about twenty years ago, and was known as Signer's Woods. The trees in this grove were magnificent specimens of white pine, with trunks several times larger than those of the average second-growth pine trees now found. The trunks were perfectly straight, and extended unbranched to a great height. At present the only first-growth pine trees in the basin are probably a few in a woodland on West Hill northwest of Ithaca, and others in a tract of forest on the hill east of White Church.

On the lower plateau from Varna, Ithaca, and Enfield northward, forests of beech and hard maple alternate with woods of basswood, elm, hickory, white oak, and red oak, with soft maples abundant on the lower grounds. Scarlet oak, dyer's oak, and chestnut occur very rarely and in isolated colonies. From Ovid northward on the Ontario plain, silver and red maples, elms, black and white ashes, and bur oak, become the dominant trees. Along the lake shores the prevailing timber is hardwood. Red cedar is fairly abundant on the lake cliffs and the steep dry hillsides bordering the lake valley. Hemlock is frequent in the ravines and about the swamps, and in the primitive forest was an important timber tree. Arbor vitae is confined to the Ontario plain. Black spruce and balsam fir are limited to a few peat bogs.

EXPLORATIONS

An excellent account of the explorations in the Cayuga Lake Basin previous to the publication of Dudley's *Flora* is given by Dudley in the introduction to his work, and is here reprinted:[44]

"The first professional botanist to penetrate any portion of this basin was John Bartram.......... in 1743.......... His journey [to Onondaga] was not primarily a botanical one, and his book entitled: 'Observations on the Inhabitants etc., in Travels from Pennsylvania to Lake Ontario,' was printed in London, 1751, and is now a rare work.

"Not many years after Peter Kalm, Professor of Œconomy at the University of Aobo in Swedish Finland, a friend of Linnæus, was sent over by the Swedish government, to collect seeds and plants for the gardens and herbaria of that country. He collected extensively in Pennsylvania, New Jersey, New York and Canada from 1748 till his return in 1751. During 1750 he made a journey 'along the Mohawk to the Iroquois nations, where he got acquainted with the Mohawks, Oneidas, Tuscaroras, Onondagas and Kayugaws.' His 'Travels into North America,' were published soon after his return and translated into English in 1772; but while he gives minute accounts of some of his experiences, his journey to, and life among the Six Nations is scarcely touched upon in these volumes. His collections which were very valuable went very largely into the Linnæan Herbarium, now in England.

"Frederick Pursh, another European explorer, passed through Ithaca in 1807. He left a record of his journey, which was overlooked until 1868, when it came to light in Philadelphia among some papers in the possession of the Amer. Phil. Society. It was published in the Gardener's Monthly and afterward in pamphlet form.[5] The following literal extract from Pursh's *Journal*, is of some general interest, but chiefly so in revealing the abundance of introduced plants even at that early day. He found nothing of importance in our region. His nomenclature will seem at the present time quite antiquated, and his English is somewhat broken:

"'July 6.—[1807.]—Left Tyoga, up Cayuta Creek—Apocynum andrasæmifolium very plenty in the cleared lands; in the oak woods I observed the Lily often seen before, but I cannot reccollect which species it is; it is Lilium foliis sparsis verticillatisque: caulle unifloro; floribus erectis, semipatentibus; petalis unguiculatis. The valley, formed by Cayuta Creek is in soil and vegetation similar to the beechwood. Oxalis acetosella—but not plenty—Helleborus viridis. Dracæna borealis,—Orchis fimbriata in full bloom—Dalibarda violoides in fruit. The woods abount with sugar-maple; The valley is in some places very narrow and the creek very winding which obliged me to wate it several times to keep the road—I heartyly expected to reach the house this night, which had been recommended to me, to stay at, but I dit come to it before it got dark. I observed in a small run a species of Sium, as I suppose, without flowres, whose leaves under the water were very fine divided and the upper ones only pinnate. I call it S. heterophyllum. From a small tavern whech is kept here, is about 22 miles to the head of Cayuga, which I intend to reach to-morrow.

"'7.—Having opportunity of going in company of a wagon, who would carry my things, I set out early this morning. The road leads through a very romantick valley, the mountains sometimes very high. After following the course of Cayuta Cr. for 9 miles, we turned off to the right. 8 miles this side of Cayuga city, or as it is called sometimes, Ithaca, we crossed a place very beautifully situated, called Sapony Hollow; this place has been once cleared and probably settled by Indians, but it is now grown up with small, white pine very handsomely mixed with Populus tremuloides and Magnolia acuminata. The last is very scarce about here and the trees here in this place and two or three others I seen are of a creeply, small and old growth, nothing like to what they are in Virginia. At this place we refreshed ourselves and feed the horses, as far as this I had this day travel very agreeable, as on account of the roughness of the road and the deep mire holes in some places the wagon could not go on as fast as I could walk, having plenty of time to look about myself, besides being unincumbered with any baggage. But the road getting now good and evening drawing nigh, I had to get into the wagon and we traveled tolerably fast. About 3 or 4 miles from Sapony Hollow, the timber changes into oak, and from there to Ithaca it is all Oak timber mixed with pine, with the rest of plants similar to Tyoga point. We arrived at Ithaca at night-fall.

"'8.—Being now on the heath of Cayuga I remembered your information about Erica cærulea growing on the high lands between Cayuga and Seneca lake; I was very

[5] It was reprinted again in 1923 by the Onondaga Historical Association, Syracuse, New York.

anxious of seeing this plant in its native place, but having not received the particular directions to find the place, as I had been promised of, besides that, being rather afraid of running myself out of money necessary to come to Onondaga, as my pocket was low and the distance considerable, I had to my own. mortification, to give up all Ideas of a search for it.[46] The morning was rather suspicious for rain, as it had rained some all night, I was detained at Ithaca until 11 o'clock, when I set out for the lake, which is only two miles distance. My route was going on the east side of it. After having crossed Cayuga Creek, with a great deal of difficulty to perform it, and coming on the rising grounds, on the other side, I heard a very strong noise of falling water: I followed the sound and came to one of the most romantick and beautiful falls of this creek, I had ever seen; the access even only to a sight of it is very difficult; but regretted very much that I had not had the least information about these falls at the town, as I should have made it my business to visit them unincumbered with my baggage, that I might have spent the day by it. The ledge of rocks confined in a very narrow cove, and surrounded by very high hills; impossible to ascend with a load on my back on account of steepness; over which this considerable stream drops itself down, is a very interesting scene, and I doubt not if time and opportunity had allowed me to make an examination of it, I might have been paid for the trouble with something or other interesting or new in my line; but to go back to the town I thought to be too much; so I had to go on and be satisfied with having had only a peep at it. I got into my road again, where I observed along the banks of the creek plants of Pentstemon pubescens, About a mile farther I came to the bank of the lake. The shore which I came to was clear and gravelly with some common weeds growing near it as thistles, mulleins, etc. I followed the shore of it for several miles, being in my route. It is generally covered with oak, maple and hickory. Buphthalmum heleanthoides is the first yellow Syngenesia plant I seen this year, Taraxacum excepted. A small Rose, similar to the one I called last year R. monticola, is very plenty here and spreads a most agreeable fragrance through the air. A species of Crataegus, Ludwigia nitida, Ceanothus Americanus, Lilium Canadense, Apocynum androsæmifolium, with a tall Molugo? Orchis fimbriata, Cornus with white berries, Erigeron corymbosum, Typha angustifolia, Smyrnium cordatum, Mimulus alatus, Galium hispidum, Veronica scutellata and some more common plants, I observed in the meadows leading to the lake. I traveled as far as the town of Milton, where I stood over night. The road, as soon as I had left the banks of the lake began to be quit of interest, as the fences of both sides and cultivated fields, with continued plantations and farms occasioned the road only to be covered with common weeds, amongst which the Verbascum thapsus, Anthemis cotula, and Polygonum hydropiper, have the upper hand. In one of the woods on this road I collected specimens of Niphrodium filix-mas?'[47]

"David Thomas, who came from Pennsylvania in 1805, and settled in Cayuga Co. near Aurora, was at first a teacher, and afterward the engineer of the western division of the Erie Canal during its construction. He had an extensive botanic garden at his place east of Levanna and was an enthusiastic botanist as well as cultivator of plants. He was the first to distinguish and describe *Ulmus racemosa*, which he did in the Amer. Jour. of Sci. Vol. XIX, p. 170. The plates of this and those of the Dicentras in Vol. XXVI, were drawn by his son John J. Thomas, who made an extensive collection of the local plants in 1827, when he was seventeen. This herbarium is still well preserved and is frequently referred to in this catalogue. Some of the specimens are very valuable, in showing the character of the ealier flora. For the great kindness of Professor Thomas in going over with this herbarium in the

[46] "The supposed occurrence of Erica, (or Bryanthus taxifolius,) in this region, was, of course, a mistake."—[*Dudley*.]

[47] "As Pursh elsewhere refers to Nephrodium marginale, the nearest relative of N. filix-mas, no doubt the one above mentioned was Aspidium Goldianum, a species not then described, but which is in his herbarium under the name of N. filix-mas, from an unknown American locality."—[*Dudley*.]

writer's presence and stating many interesting facts, the latter wishes here to make due acknowledgement.

"Dr. Aikin, a young medical student and pupil of Professor Amos Eaton, visited this region about 1830, and reported several rare plants. Dr. Jedediah Smith of Geneva, Dr. Alex. Thompson of Aurora, Dr. H. P. Sartwell of Penn Yan and Dr. S. B. Bradley of Greece all botanized more or less within our limits, and discovered many interesting things. Dr. Asa Gray, in 1831, visited the Montezuma Marshes and this lake, stopping at Sheldrake, and finding two rare plants *Pogonia pendula* and *Linaria Elatine*. In Seneca Co., probably, he obtained *Goodyera Menziesii*. He visited Ithaca but did not remain long. Rev. J. W. Chickering and Prof. W. H. Brewer collected several hundred specimens between Cayuga and Seneca Lakes, while they were teachers at Ovid.

"From 1860 to 1865, the Hon. H. B. Lord reported a considerable number of interesting plants and having been a resident of Ludlowville and Ithaca for many years he has given the younger generation of botanists very material aid in regard to localities and rare plants. He was particularly interested in *Carices* and gave to the University a valuable local collection, at the time of its opening. His name often occurs in this catalogue, but not nearly so often as his intimate and accurate knowledge of our plants would deserve.

"At the opening of Cornell University in 1869, Professor A. N. Prentiss of Michigan Agr. Coll. was made Professor of Botany and Horticulture, and in spite of his administrative and other duties, has always manifested great interest in the development of the local flora. Under his careful guidance several special students, among them Mr. Theo. B. Comstock and Mr. David S. Jordan, both occupying prominent college positions at present, became deeply interested in the explorations and the latter summarized during his Senior year (1872), the results of his own experience and that of his friends in a manuscript catalogue. This was compiled from memory, and largely without the aid of preserved specimens and therefore contained some errors. But after throwing these out it still shows about 650 species. In this catalogue were 33 species of Carices, 35 species of Grasses, 6 Willows and 79 Compositae.

"There was at that time a group of men in the University who were strongly interested in botany and who never ceased to keep up that interest. These were Messrs H. E. Copeland, W. A. Kellermann, J. C. Branner, and the writer. Soon after these men left college, there came an excellent botanical student, Mr. F. B. Hine, whose name is mentioned frequently in the following pages. Then came Messrs. William Trelease, F. H. Severance and Charles Atwood, who added to our knowledge of the flora. Especially associated with my own work of exploration in 1881 and 1882, Mr. F. Cooper Curtice, now of the U. S. Geological Survey, rendered most efficient aid by his excellent observing powers.

"The names of Mrs. Professor Brun, Miss I. Howland, Mr. F. L. Kilborne; and among recent students, Mr. O. E. Pearce, Messrs. A. L. and F. V. Coville will be found after their discoveries in the following catalogue indicating in a slight way the aid they have rendered in voluntarily reporting localities or specimens.

"Although the writer compiled a manuscript catalogue in 1876, containing 950 flowering plants, and has written out special catalogues of the Compositæ, Gramineæ and Vascular Cryptogamia, since that time his work on the flora for the past five years has been more systematic than before. He has kept slip records of the occurrence of every plant noticed on the numerous excursions made, providing there was any reason for supposing the plant was in the least uncommon. In some cases, as in some of the orchids and sedges these separate entries for distinct localities have been fifty or seventy-five, in other cases comparatively few. That the number of discoveries of species alone, new to the flora, has been 510 more than the number in Dr. Jordan's catalogue is in itself significant of the industry of the survey."

Dudley's *Flora* was planned to include also the lower groups of plants, but only the first part, dealing with the gymnosperms and the phanerogams, was published.

Since the publication of Dudley's *Flora* in 1886, the exploration of the Cayuga Lake Basin with respect to the vascular plants has been prosecuted interruptedly by a number of local botanists. Some of these were only incidentally interested, mainly as students, while others were engaged in the work seriously. Professor W. W. Rowlee took an active interest in the flora from 1888 until his death in 1923, and many valuable records were made by him during that long period. In 1892 and 1894, E. J. Durand, D. F. Hoy, and the senior author of this flora, began their field studies about Ithaca. In the following years several persons connected with the Department of Botany made important collections. Dr. L. H. Bailey has resided in Ithaca for many years, and has made a number of important records. When the new Department of Botany in the College of Agriculture was founded in 1913, work was begun in earnest looking toward the publication of a new flora of the vascular plants of the basin. During the period from 1913 until the present, much of the time of several persons has been employed in exploring the region, and 14,000 collections of vascular plants have been made. Also, a vast number of records have been obtained on distribution, soil requirements, and other factors. The persons most active during this period besides the authors, under whose direction the work was done and who have contributed the major part of the collections and records, were E. L. Palmer, L. H. MacDaniels, C. C. Thomas, F. P. Metcalf, A. Gershoy, A. R. Bechtel, W. C. Muenscher, L. F. Randolph, A. H. Wright, and S. H. Burnham. Nearly every part of the basin has been visited, usually more than once at different seasons, and some places have been visited many times. It is hoped, therefore, that the records set forth in the present catalog will be found to be fairly complete.

AFFINITIES OF THE CAYUGA LAKE FLORA

Certain plants occurring within the limits of the basin, such as *Primula mistassinica, Pinguicula vulgaris, Saxifraga aizoides,* and *Carex capillaris,* are well known to be of northern range and to find their southern limits in or near the Cayuga Lake Valley. So also it is known that *Magnolia acuminata, Gymnocladus dioica, Rudbeckia speciosa, Listera australis,* and other plants, find their northern limits in the Cayuga region or extend only slightly beyond. It is known further that many bog plants have a northern range. To what extent these northern and southern elements form parts of the flora, and whether there are also other elements, is not so apparent. Dudley, to be sure, listed thirteen northern plants that have their southern limits here, and noted fifteen western plants extending scarcely farther eastward, as well as fifteen southern plants which rarely extend farther northward; yet more complete data have been lacking.

In order to get more definite information, a detailed study of the affinities of the Cayuga flora was undertaken. The tables and results obtained are so voluminous, however, that it has seemed necessary to reserve them for a separate paper. Only the general plan of the investigations can be outlined here, and the principal results noted. It was first thought necessary to tabulate all the plants of the flora, but when the "rare," "scarce," "infrequent," and "occasional" plants were noted in one table, and some of the "frequent" and "common" plants in another, it became apparent that the latter were so general in their occurrence as to furnish no important information concerning affinities. It was therefore decided to confine the study to the former table. These unusual plants, being on the outskirts of their range, apparently indicate more clearly the geographical relationships. A large table was prepared, in which the 446 species rated as rare, scarce, infrequent, and occasional were listed under the following headings: pteridophytes, gymnosperms, monocotyledons, or dicotyledons; northern, southern, coastal, saline, Appalachian, central, Mississippian, or general western, range; acid bogs, marl bogs, general wet

or dry nonboggy soil; Ontario plain, Cayuga Lake Valley, high hills, or ravines. In this table, "marl bogs" included also the wet soil about marl springs. Under "high hills" was included the region of higher altitude lying on the upper plateau of the basin and extending from southwest, south, and east of Ithaca to the McLean Bogs and Cortland. "Cayuga Lake Valley" included the land immediately adjoining the lake and back for a mile or two into the country, and up the Inlet Valley to Summit Marsh and Spencer Lake. The two last-named localities are rather more closely affiliated with the lake valley, and through it with the Ontario plain, than with the surrounding highlands. "Ontario plain" in the table was considered to extend from beyond the northern border of the basin southward to the foothills of the central plateau at Geneva and Cayuga. From this initial table many other tables were prepared, showing for the Ontario plain and other regions the proportion of pteridophytes, gymnosperms, monocotyledons, and dicotyledons, on acid bogs, marl bogs, or wet or dry soils.

From the tables prepared, the following generalizations may be deduced. It should be borne in mind that the figures given will not always equal the totals, for some plants belong in two or more categories. The generalizations are interesting; but too much weight must not be placed upon them, because they are based on a comparatively small number of plants and the experimental error is large. However, when the differences are large there is little doubt that the results given are significant.

The flora of the Cayuga Lake Basin in general has a distinctly northern affinity (127); somewhat fewer species are central (109), and distinctly fewer are southern (79). There is a strongly marked western element (73), part of which is distinctly of the Ohio and Mississippi Valleys while the remainder is generally western. A noticeable though much less extensive Atlantic coastal element (51) is evident, some of which is truly of the coastal plain (28) while the remainder consists of salt-loving plants (23). A small element of truly Appalachian plants is noted, though many of the so-called "central" plants are more or less definitely Alleghenian, a fact which has led Dudley to correctly point out that not only is this region a foothill region of the Alleghenies, but also its flora is strongly Alleghenian as well. Exclusive of the two kinds of bog floras, which are rather generally distributed, the northern plants listed are slightly more numerous on the higher hills, the southern plants are rather distinctly more abundant in the lake valley (58) with a large number on the Ontario plain (41) and few on the hills (24), and the western element is distinctly greatest in the Cayuga Lake Valley (53) with few plants on the Ontario plain (17) and on the high hills (17). The monocotyledons are slightly more northern than the dicotyledons, while the dicotyledons show a strongly developed western affinity.

It was found that peat bogs and marl bogs form two of the most distinct local floral units, the former being generally acid in reaction and the latter weakly alkaline and strongly calcareous. There were 21 monocots and 15 dicots found in peat bogs, and 33 monocots and 26 dicots in marl bogs. The northern plants generally outnumber those of any other region in both peat and marl bogs, the southern and western plants being seldom found in bogs of either sort. Bog plants are mostly common to both the Ontario plain and the higher altitudes of the hills.

Of the plants in the list inhabiting wet nonboggy soil (146), there are more monocotyledons than dicotyledons. The largest number occur on the Ontario plain (93) and in the Cayuga Lake Valley (83), while on the hills the number is smaller (56). Of these wet-soil plants, the northern (38) about equal the central (36), while only 19 are southern, 19 western, and a moderate number coastal (11). A strong saline element is seen (21). The northern species are about equally distributed on the hills (19), on the Ontario plain (19), and in the lake valley (18). The southern species are more numerous in the lake valley (16) and on the Ontario plain (14), while only 7 are found on the hills. Of the western plants of wet soil, 14 are found in the lake valley, 10 on the Ontario plain, and 5 on the high hills. Of the coastal plants, 8

occur on the Ontario plain, 5 in the lake valley, and 4 on the hills. Of the salt plants, 21 are found on the Ontario plain, 7 in the lake valley, and none on the hills or in the ravines. The coastal and salt plants are chiefly of wet soil, the ratio being 32 in wet soil, 12 in bogs, and 7 in dry soil.

The rare plants of dry soil (201), nearly one-half of the entire list, are strongly dicotyledonous. Distinctly the largest number (117) occur in the lake valley, while only 66 are found on the Ontario plain, 87 on the hills, and 89 in the ravines. Of these dry-soil plants, almost an equal number are southern (55), central (55), and western (50), while the northern (29) and coastal (7) plants are distinctly less numerous. Of the dry-soil plants of northern range, by far the largest number occur on the hills (18) or in the ravines (16), with only 3 on the Ontario plain and 8 in the lake valley. The southern species are found more abundantly in the lake valley (42), though many occur in the ravines (25) and on the Ontario plain (27). A distinctly smaller number (17) of southern plants occur on the hills. The dry-soil plants of western affinity are most abundant in the lake valley (39) and are fairly abundant in the ravines (28), while the number on the Ontario plain (7) and on the hills (12) is small indeed. Judging from the dry-soil plants alone, apparently the best indicators, the Ontario plain is much more southern (27) than northern (3), the Cayuga Lake Valley is very strongly southern (42 southern, 8 northern) and western (39), while the hills are almost equally northern (18) and southern (17) and fairly strongly western (12). The ravines harbor many rare plants of southern and western affinity in about equal numbers, and a moderate number of northern plants, this condition being probably due to protection from extremes of climate and to the diversity of conditions on the northern and the southern slopes. The sun-parched northern wall is suitable for southern plants, while the sun-screened southern wall often harbors plants of the Canadian Life Zone.

In this study the authors were surprised to find so many western plants in the lake valley, but a greater surprise was the very weakly northern nature of the dry-soil hill flora (18 northern, 17 southern). If it were not for the wet-soil plants of the hills (19 northern, 7 southern), the general belief that the hill flora represents a more northern life zone would be scarcely well founded. Yet some elements of the plateau flora, especially toward McLean, and also the fauna of that same region, indicate a distinct Canadian element on the plateau.[48]

The rarer northern plants finding their southern limit in central New York, or in a few cases extending to northern Pennsylvania, number about 44. These are given in the following list. Many more extend only into Pennsylvania or northern New Jersey.

Equisetum palustre
Lycopodium annotinum
Juniperus communis, var. *depressa*
Potamogeton alpinus
Potamogeton Friesii
Potamogeton vaginatus
Triglochin palustris
Glyceria Fernaldii
Glyceria borealis
Calamagrostis hyperborea
Cinna latifolia
Zizania palustris
Scirpus pauciflorus
Scirpus hudsonianus
Scirpus rubrotinctus
Eriophorum viridi-carinatum
Carex gynocrates
Carex Crawfordii
Carex Deweyana
Carex capillaris
Carex cryptolepis
Carex Oederi, var. *pumila*
Carex Pseudo-Cyperus
Juncus alpinus, and vars.

[48] Compare Dudley, W. R., The Cayuga Flora (introduction); also Reed, Hugh D., and Wright, Albert H., The Vertebrates of the Cayuga Lake Basin, N. Y. (Proc. Amer. Philosoph. Soc. 48:376. 1909). Dudley does not definitely assert that the hill flora is northern, but he frequently speaks of the "cold swamps" of the McLean region. He notes the occurrence of southern plants in the lake valley.

Habenaria dilatata
Spiranthes Romanzoffiana
Epipactis tesselata
Populus tacamahacca
Salix serissima
Draba arabisans
Saxifraga aizoides
Lathyrus palustris
Geranium Bicknellii
Viola renifolia, var. *Brainerdi*
Hippuris vulgaris
Pyrola asarifolia, var. *incarnata*
Kalmia polifolia
Primula mistassinica
Pinguicula vulgaris
Galium trifidum
Galium labradoricum
Lonicera oblongifolia
Valeriana uliginosa
Petasites palmatus

Of these, *Saxifraga aizoides*, *Primula mistassinica*, and *Pinguicula vulgaris* constitute a very interesting group of boreal plants found elsewhere in New York only in two or three very restricted localities, where generally they grow on cool, shady, dripping, lime cliffs protected from the sunlight. They all occur on the south wall of Taughannock Gorge; the two latter are found in Fall Creek Gorge, and the last one also in Cascadilla Glen. It is supposed that they represent a northern flora which once was more common here. As plants migrated northward following the retreat of the glacier, certain colonies of these plants were left behind while the main body continued northward. These colonies retreated to the shaded wet walls of the ravines then forming, or to cold springs, where they now remain isolated from the main range of the species. *Carex capillaris* was thus isolated in the cold springs and marl ponds at Cortland, where it represented the only known station in New York State; but it is now probably exterminated, due partly to the use of the springs as a city water supply.

The southern element in the flora is represented by many plants, among which the following 53 species extend northward only to central New York, or in a few instances to the north shore of Lake Ontario (indicated by a capital O).

Elymus australis
Muhlenbergia tenuiflora O
Panicum flexile
Panicum virgatum O
Panicum depauperatum O
Panicum sphaerocarpon
Panicum villosissimum
Panicum umbrosum
Panicum Boscii
Cyperus ferax
Cyperus erythrorhizos
Cyperus Engelmanni
Eleocharis quadrangulata
Fimbristylis autumnalis
Scleria verticillata O
Carex digitalis O
Carex retroflexa O
Carex Muhlenbergii, var. *enervis*
Carex triceps, var. *hirsuta*
Wolffia columbiana O
Juncus marginatus
Habenaria ciliaris
Triphora trianthophora
Isotria verticillata
Corallorrhiza odontorhiza
Polygonum robustius
Silene stellata
Cimicifuga racemosa
Agrimonia rostellata
Agrimonia mollis
Agrimonia parviflora
Crataegus Boyntoni
Crataegus intricata
Lespedeza violacea
Desmodium rotundifolium
Desmodium bracteasum
Desmodium marilandicum
Tephrosia virginiana
Linum virginianum
Geranium carolinianum
Viola affinis
Sanicula canadensis O
Nyssa sylvatica
Chimaphila maculata O
Gentiana quinquefolia O
Asclepias tuberosa O
Monarda punctata
Physalis heterophylla, var. *ambigua*
Physalis subglabrata
Conopholis americana O
Galium pilosum
Solidago ulmifolia
Rudbeckia speciosa

A not inconsiderable element of western and southwestern plants is found in th flora. Many of these plants are typical of the rich lands of the Ohio and Mississip Valleys. The following are plants of western and southwestern affinity which, far as can be determined, reach their eastern limit in the Cayuga Lake Basin extend beyond only to eastern New York:

Azolla caroliniana	*Gymnocladus dioica*
Poa sylvestris ?	*Astragalus canadensis*
Carex Sartwellii	*Astragalus neglectus*
Carex Jamesii	*Evonymus atropurpureus*
Carex Careyana	*Hybanthus concolor*
Wolffia punctata	*Myriophyllum heterophyllum* ?
Disporum lanuginosum	*Lithospermum latifolium*
Carya laciniosa	*Onosmodium hispidissimum*
Magnolia acuminata	*Monarda clinopodia*
Jeffersonia diphylla	*Campanula americana*
Amelanchier humilis	*Solidago ohioensis*
Rosa setigera	*Polymnia uvedalia*

A very interesting group of salt plants is found in the flora. These are near all confined to the Ontario plain and adjacent parts of the lake valley. Some of thes which occur about salt springs, are plainly influenced in distribution by the salt; the case of other species less closely associated with such springs, the importance salt as a factor is less clear. The following salt plants are of interest:

Ruppia maritima, var. *longipes*	*Eleocharis rostellata*
Najas marina	*Scirpus nanus*
Zannichellia palustris	*Scirpus campestris*, var. *paludosus*
Triglochin maritima	*Juncus Gerardi*
Diplachne maritima	*Juncus compressus*
Phragmites communis	*Juncus dichotomus*, var. *platyphyllus*
Puccinellia distans and var. *tenuis* (adventive)	*Chenopodium rubrum*
Spartina Michauxiana	*Salicornia europaea* (adventive)
Hierochloë odorata, var. *fragrans*	*Spergularia alata*
Zizania aquatica	*Ranunculus Cymbalaria*
Panicum dichotomiflorum ?	*Hibiscus Moscheutos* ?
	Samolus floribundus ?

Coastal Plain plants not directly influenced by salt constitute a small but distin element of the flora. In this connection the following may be mentioned:

Woodwardia virginica	*Carex triceps*, var. *hirsuta*
Isoëtes Engelmanni	*Carex intumescens* (true) ?
Potamogeton bupleuroides (possibly influenced by salt)	*Peltandra virginica*
Echinochloa Walteri (possibly influenced by salt)	*Juncus articulatus* ?
Cyperus ferax ?	*Listera australis*
Eleocharis quadrangulata	*Myrica carolinensis*
Fimbristylis autumnalis	*Alnus rugosa*
Carex alata (possibly influenced by salt)	*Polygonum pennsylvanicum* (true)
Carex annectens (true)	*Polygonum robustius* ?
Carex Howei	*Drosera longifolia*
Carex incamperta	*Lupinus perennis*
	Baptisia tinctoria
	Rhexia virginica
	Lyonia ligustrina

Trichostema dichotomum ?
Utricularia gibba
Mikania scandens
Bidens laevis
Bidens discoidea ?
Cirsium pumilum
Lactuca hirsuta

Many of the common species have a general Appalachian distribution, but it has proved difficult to distinguish accurately between those so distributed and those of more central or southern range. Some of the rarer plants which show an Appalachian distribution are:

Elymus canadensis (true)
Glyceria melicaria ?
Danthonia compressa
Carex radiata (true)
Carex aestivalis
Dicentra eximia ?
Ribes rotundifolium
Amelanchier intermedia
Rhododendron maximum
Kalmia latifolia

INTERESTING BOTANICAL REGIONS

In the territory covered by any flora there are naturally certain regions of special interest. Information about such localities in the Cayuga Lake Basin may be desired by students as an aid in their own local explorations. Some of the more important of these regions are discussed in the following pages, beginning with those at the northern end of the basin.

Duck Lake region.— In the region of Duck Lake there is a series of extensive bogs, some calcareous and some acid, lying in an area of moderately light, generally calcareous, glacial deposit, which deposit forms the low uplands between the swamps. Several small lakes are included here. As the region lies on the Ontario plain and not far from the salt springs of Montezuma, there is some evidence of the effect of salt upon the vegetation. In the region lie Duck Lake, Mud Pond, Crusoe Lake, Duck Lake swamps, Miller Bog, Featherbed Bog, Mud Pond bogs, and Butler tamarack swamp. The more interesting and unusual plants are:

Woodwardia virginica
Botrychium angustisegmentum
Botrychium matricariaefolium
Isoëtes echinospora, var. *Braunii*
Picea mariana
Thuja occidentalis
Najas marina
Scheuchzeria palustris
Triglochin palustris
Triglochin maritima
Eleocharis quadrangulata
Eleocharis olivacea
Eleocharis rostellata
Scirpus hudsonianus
Eriophorum callitrix
Mariscus mariscoides
Carex Howei
Carex alata
Carex Crawfordii
Carex paupercula
Carex limosa
Juncus Torreyi
Juncus canadensis
Smilacina trifolia
Cypripedium reginae
Cypripedium parviflorum
Habenaria clavellata
Habenaria bracteata
Habenaria flava, var. *virescens*
Habenaria dilatata
Habenaria blephariglottis
Triphora trianthophora
Isotria verticillata
Calopogon pulchellus
Arethusa bulbosa
Serapias Helleborine
Listera australis
Microstylis unifolia
Salix candida
Salix pedicellaris (true)
Myrica Gale, var. *subglabra*
Brasenia Schreberi
Potentilla fruticosa
Pyrola asarifolia, var. *incarnata*
Kalmia polifolia
Chamaedaphne calyculata

Ledum groenlandicum
Andromeda glaucophylla
Chiogenes hispidula
Vaccinium Oxycoccus
Samolus floribundus
Bartonia virginica
Agalinis paupercula
Utricularia intermedia
Utricularia minor
Dianthera americana
Galium labradoricum
Lonicera oblongifolia
Valeriana uliginosa
Aster junceus
Bidens laevis

Junius region.— The most interesting local region in the Cayuga Lake Basin is that about Junius, as it presents the most unusual combination of soil conditions and is the richest in rare plants. It lies in an uneven sandy country on the Ontario plain and on the boundary between the Cayuga and Seneca basins. In the region are marl ponds and marl bogs adjacent to large peat bogs, and all are bordered by sandy, generally acid, fields and woodlands. In the marl region are the two Lowery Ponds, Newton Ponds, Phillips Pond, and Vandemark Pond, with their surrounding boggy moors. In the acid part are Pout Pond, the Pout Bond bog, and two or three other bogs. This region was an old collecting ground of the well-known botanist Dr. H. P. Sartwell, of Penn Yan, who in the middle of the nineteenth century made known many of its rarities through specimens distributed to various herbaria. The more interesting plants in this region are:

Lycopodium inundatum
Picea mariana
Thuja occidentalis
Scheuchzeria palustris
Triglochin palustris
Glyceria septentrionalis
Calamagrostis hyperborea
Paspalum ciliatifolium
Panicum flexile
Panicum depauperatum
Panicum sphaerocarpon
Panicum villosissimum
Panicum tsugetorum
Cenchrus pauciflorus
Cyperus filiculmis
Eleocharis olivacea
Eleocharis rostellata
Eriophorum callitrix
Eriophorum gracile
Rynchospora capillacea
Mariscus mariscoides
Scleria verticillata
Scleria pauciflora, var. *caroliniana*
Carex pauciflora
Carex cryptolepis
Carex decomposita
Carex Sartwellii
Carex chordorrhiza
Carex rosea (true)
Carex sterilis (true)
Carex Howei
Carex limosa
Carex paupercula
Carex polygama
Carex tetanica
Carex Pseudo-Cyperus
Wolffia columbiana
Chamaelirium luteum
Habenaria clavellata
Habenaria ciliaris
Habenaria blephariglottis
Calopogon pulchellus
Spiranthes Romanzoffiana
Salix serissima
Salix candida
Myrica carolinensis
Arceuthobium pusillum
Thalictrum revolutum
Anemone cylindrica
Drosera longifolia
Aronia arbutifolia, var. *atropurpurea*
Potentilla fruticosa
Baptisia tinctoria
Tephrosia virginiana
Desmodium marilandicum
Euphorbia corollata
Helianthemum canadense
Helianthemum Bicknellii
Andromeda glaucophylla
Vaccinium Oxycoccus
Vaccinium macrocarpon
Gentiana crinita
Gentiana linearis ?
Bartonia virginica
Asclepias tuberosa
Monarda punctata

Pycnanthemum virginianum
Agalinis paupercula
Agalinis tenuifolia
Castilleja coccinea
Utricularia intermedia
Utricularia gibba
Utricularia minor ?
Utricularia cornuta
Galium pilosum
Lonicera oblongifolia
Solidago ohioensis
Aster lucidulus
Antennaria occidentalis
Centaurea Jacea
Centaurea maculosa

Montezuma and Cayuga region.— The Montezuma and Cayuga region lies directly at the northern end of Cayuga Lake, in rather heavy or sometimes gravelly, generally calcareous, soil. In it are very extensive cattail and sedge marshes many square miles in area, through which flow the Seneca and Clyde Rivers. In the region also are several salt springs. Where these springs occur outside of the large marshes, they have occasionally produced local swales which are highly brackish and are populated by many characteristic salt-marsh plants. The flora of even the larger marshes, however, seems to indicate at least a trace of salt. The more interesting plants in this region are as follows:

Azolla caroliniana
Ophioglossum vulgatum
Typha angustifolia, var. *elongata*
Najas marina
Ruppia maritima, var. *longipes*
Diplachne maritima
Glyceria pallida
Puccinellia distans
Puccinellia distans, var. *tenuis*
Spartina Michauxiana
Hierochloë odorata, var. *fragrans*
Zizania aquatica
Panicum dichotomiflorum
Panicum clandestinum
Cyperus aristatus
Cyperus diandrus
Cyperus Engelmanni
Cyperus ferax
Eleocharis rostellata
Scirpus nanus
Scirpus campestris, var. *paludosus*
Carex Sartwellii
Carex alata
Carex longirostris
Carex Pseudo-Cyperus
Carex Grayii
Arisaema Dracontium
Wolffia columbiana
Wolffia punctata
Juncus Gerardi
Juncus dichotomus, var. *platyphyllus*
Juncus Torreyi
Carya laciniosa
Polygonum robustius
Polygonum hydropiperoides
Chenopodium rubrum
Spergularia alata
Nymphaea tuberosa
Ranunculus longirostris
Ranunculus Cymbalaria
Ranunculus delphinifolius
Armoracia aquatica
Cassia marilandica
Hibiscus Moscheutos
Hypericum majus
Viola affinis
Lythrum alatum
Oenothera pratensis
Myriophyllum verticillatum, var. *pectinatum*
Hippuris vulgaris
Samolus floribundus
Cuscuta Cephalanthi
Veronica Anagallis-aquatica, var. *glandulosa*
Dianthera americana
Mikania scandens
Bidens laevis
Bidens Beckii

Region from Union Springs to King Ferry.— The eastern side of the lake is more interesting botanically than the western side. At the northern end, below Union Springs the land is rather low and the lake shore frequently marshy. About Union Springs there is a combination of small marshes, calcareous springs, ravines, sandy shores, and rich soils, rendering this one of the most important local collecting

centers. At King Ferry and intermittently southward are rocky cliffs capped by rather heavy soils. These drier shores support several rare plants, some of which are of western affinity. The more interesting plants of this region are:

Potamogeton filiformis
Deschampsia flexuosa
Deschampsia caespitosa
Sorghastrum nutans
Cyperus ferax
Fimbristylis autumnalis
Scirpus pauciflorus
Scirpus Smithii
Carex Willdenowii
Carex oligocarpa
Arisaema Dracontium
Juncus alpinus, var. *fuscescens*
Salix longifolia
Quercus Muhlenbergii
Urtica dioica
Aristolochia Clematitis
Chenopodium rubrum
Nelumbo lutea
Ranunculus reptans, var. *ovalis*
Jeffersonia diphylla
Amelanchier humilis
Amelanchier amabilis
Crataegus macracantha
Crataegus intricata
Crataegus submollis
Potentilla Anserina
Potentilla recta, var. *obscura*
Agrimonia rostellata
Agrimonia mollis
Astragalus canadensis
Astragalus neglectus
Lespedeza violacea
Euphorbia Helioscopia
Hibiscus Moscheutos
Hibiscus Trionum
Rhexia virginica
Myriophyllum heterophyllum
Hippuris vulgaris
Samolus floribundus
Gentiana Andrewsii
Cynanchum nigrum
Asclepias tuberosa
Convolvulus spithamaeus
Cuscuta Cephalanthi
Stachys palustris
Pycnanthemum virginianum
Linaria Elatine
Veronica virginica
Agalinis paupercula
Dianthera americana
Succisa australis
Rudbeckia speciosa
Polymnia uvedalia

Ithaca flats.— The bottom-land region extending from the mouth of Enfield Creek to Cayuga Lake is noted more for the richness of its flora than for the number of rare native plants. Many rare weeds are found in this region, however. Some of the more unusual native plants found here are the following:

Equisetum palustre
Elymus australis, var. *glabriflorus*
Elymus canadensis (true)
Glyceria pallida
Glyceria septentrionalis
Zizania palustris
Zizania aquatica
Cyperus aristatus
Cyperus diandrus
Cyperus erythrorhizos
Scirpus Smithii
Scirpus rubrotinctus
Scirpus polyphyllus
Carex prairea
Carex longirostris
Carex Grayii
Arisaema Dracontium
Juncus Torreyi
Salix candida
Salix longifolia
Salix alba × lucida
Alnus rugosa
Cerastium nutans
Nymphaea tuberosa
Ranunculus reptans, var. *ovalis*
Ranunculus delphinifolius
Sanguisorba canadensis
Gymnocladus dioica
Lespedeza capitata
Acer Negundo (native)
Floerkea proserpinacoides
Helianthemum Bicknellii (sandy bank)
Hypericum Ascyron
Viola striata
Myriophyllum verticillatum, var. *pectinatum*

Chaerophyllum procumbens
Agastache nepetoides
Agastache scrophulariaefolia
Veronica Anagallis-aquatica, var. *latifolia*
Veronica virginica
Galium pilosum (sandy bank)
Campanula americana

South Hill.— Besides the number of interesting though scattered species in the general region of South Hill, there is a particularly interesting colony of rare plants in or near South Hill Marsh. Some of these plants suggest the light-acid-soil floras of the Coastal Plain and the Southern States, and the woodland about the marsh has much the appearance of the scrub-oak barrens of eastern Massachusetts. The reason for this affinity is not clear. The soil is chestnut and noncalcareous. The following unusual plants are found on South Hill:

Carex hirta (north slope)
Carex incomperta
Carex glaucodea
Carex folliculata
Juncus marginatus
Habenaria flava, var. *virescens*
Rosa setigera (north slope)
Aronia arbutifolia, var. *atropurpurea*
Amelanchier intermedia
Prunus susquehanae
Linum virginianum
Viola sagittata, var. *ovata*
Lyonia ligustrina
Onosmodium hispidissimum (north slope)
Veronica Anagallis-aquatica, var. *latifolia* (north slope)
Houstonia caerulea
Antennaria occidentalis
Antennaria Parlinii

Ravines.— The most characteristic topographical peculiarity of the Cayuga Lake Basin is the extensive ravine formation. Botanically the ravines are very interesting, and they furnish a large number of plants not generally found elsewhere. Of these, *Draba arabisans, Saxifraga aizoides, Primula mistassinica,* and *Pinguicula vulgaris,* are noted as relics of the postglacial migration and are now known elsewhere in New York State only in very isolated localities, though they are frequent in high northern latitudes. The more important unusual plants are as follows:

Woodsia ilvensis
Woodsia obtusa
Thelypteris Goldiana
Thelypteris hexagonoptera
Thelypteris Phegopteris
Athyrium angustifolium
Athyrium acrostichoides
Camptosorus rhizophyllus
Pellaea atropurpurea
Cryptogramma Stelleri
Selaginella rupestris
Bromus Kalmii
Poa sylvestris
Oryzopsis pungens
Panicum umbrosum
Panicum Boscii
Carex Careyana
Carex Jamesii
Carex Willdenowii
Carex oligocarpa
Carex Woodii
Cypripedium parviflorum, var. *pubescens*
Triphora trianthophora
Aplectrum hyemale
Epipactis repens, var. *ophioides*
Epipactis tessellata
Populus tacamahacca
Cerastium nutans
Clematis verticillaris
Jeffersonia diphylla
Adlumia fungosa
Corydalis sempervirens
Corydalis aurea
Draba arabisans
Sisymbrium brachycarpon
Cardamine parviflora
Arabis lyrata
Parnassia caroliniana
Saxifraga aizoides
Agrimonia rostellata
Agrimonia mollis
Agrimonia parviflora
Amelanchier amabilis
Desmodium marilandicum
Lespedeza procumbens
Geranium carolinianum
Geranium Bicknellii

Helianthemum Bicknellii
Hypericum Ascyron
Lechea intermedia
Hybanthus concolor
Viola latiuscula
Viola Selkirkii
Viola striata
Epilobium glandulosum, var. *perplexans*
Circaea canadensis
Pterospora andromedea
Arctostaphylos Uva-ursi
Vaccinium canadense
Primula mistassinica
Samolus floribundus
Convolvulus spithamaeus
Cuscuta Coryli
Lithospermum latifolium
Onosmodium hispidissimum
Agastache nepetoides
Agastache scrophulariaefolia
Monarda clinopodia
Pycnanthemum virginianum
Veronica Anagallis-aquatica, var. *latifolia*
Agalinis tenuifolia
Pedicularis lanceolata
Pinguicula vulgaris
Galium pilosum
Lobelia Kalmii
Eupatorium sessilifolium
Solidago ulmifolia
Polymnia uvedolia
Polymnia canadensis
Rudbeckia speciosa
Petasites palmatus

Summit Marsh and Spencer Lake — The region of Summit Marsh and Spencer Lake lies on the valley floor on the watershed between the Cayuga Lake Basin and the Susquehanna Valley. It was through this valley, in part, that the glacial waters flowed southward from the melting ice in the Ontario Basin. It is interesting, therefore, to note that the flora of these marshes shows a somewhat greater affinity with that of the present Ontario plain than with that of the adjoining hills. Some of the interesting plants of this region are:

Sparganium minimum
Potamogeton alpinus ?
Potamogeton Friesii
Potamogeton obtusifolius
Sagittaria heterophylla
Glyceria canadensis
Phragmites communis
Deschampsia caespitosa
Muhlenbergia racemosa
Eleocharis olivacea
Scirpus pauciflorus
Mariscus mariscoides
Carex cryptolepis
Carex Schweinitzii
Juncus canadensis
Spiranthes Romanzoffiana
Polygonum hydropiperoides
Brasenia Schreberi
Ranunculus delphinifolius
Coronilla varia
Polygala verticillata, var. *ambigua*
Hypericum majus
Imperatoria Ostruthium
Vaccinium macrocarpon
Menyanthes trifoliata
Pycnanthemum flexuosum
Utricularia intermedia
Utricularia minor
Galium trifidum
Lonicera sempervirens
Lobelia Kalmii
Bidens discoidea

High hills south of Ithaca.— The hilltops of the plateau region furnish a number of plants which are rare or absent in other parts of the Cayuga Lake Basin. Some of these have a northern, some a southern, affinity. The larger part of the soil is noncalcareous. The following plants may be mentioned as inhabiting this region:

Lycopodium annotinum, and var. *acrifolium*
Lycopodium clavatum
Lycopodium tristachyum
Abies balsamea
Deschampsia flexuosa
Calamagrostis perplexa
Panicum tsugetorum
Panicum xanthophysum
Scirpus polyphyllus
Scirpus atrocinctus
Carex radiata
Carex annectens, and var. *xanthocarpa*
Carex foenea

Carex aestivalis
Chamaelirium luteum
Trillium undulatum
Cypripedium acaule
Habenaria flava, var. *virescens*
Habenaria Hookeri
Habenaria orbiculata
Isotria verticillata
Epipactis tessellata
Microstylis monophyllos
Microstylis unifolia
Corallorrhiza odontorhiza
Aplectrum hyemale
Myrica asplenifolia
Betula papyrifera
Arabis lyrata
Amelanchier sanguinea
Viola latiuscula
Viola sagittata, var. *ovata*
Viola affinis
Pterospora andromedea
Rhododendron maximum
Arctostaphylos Uva-ursi
Asclepias phytolaccoides
Convolvulus spithamaeus
Cuscuta Coryli
Cynoglossum boreale
Antennaria Parlinii

McLean and Freeville region.— The McLean and Freeville region lies on the watershed between Cayuga Lake, Owasco Lake, and the Tioughnioga River (a tributary of the Susquehanna). It abounds in acid bogs and marl springs lying in an uneven glacial topography, the upland supporting a beech and hard-maple forest. The altitude is sufficiently high to account for a number of typically northern plants in the deeper parts of the swamps. In this region lie Dryden Lake, Freeville Bog, Fir Tree Swamp, Woodwardia Bog, Mud Creek Swamp, Malloryville Bog, McLean Bogs, Beaver Brook swamp, Chicago Bog, and the Cortland marl ponds. This is one of the richest and most diversified collecting regions in the basin. The soil is generally calcareous and rarely heavy. Some of the interesting plants of the region are:

Woodwardia virginica
Ophioglossum vulgatum
Isoëtes Engelmanni
Equisetum scirpoides
Lycopodium annotinum, var. *acrifolium*
Picea mariana
Abies balsamea
Sparganium minimum
Glyceria melicaria
Glyceria Fernaldii
Poa saltuensis
Deschampsia caespitosa
Scirpus hudsonianus
Eriophorum callitrix
Eriophorum gracile
Mariscus mariscoides
Carex pauciflora
Carex Howei
Carex echinata, var. *cephalantha*
Carex prairea
Carex paupercula
Carex limosa
Carex laxiflora (true)
Carex capillaris
Carex folliculata
Carex Schweinitzii
Carex Grayii
Arisaema Dracontium
Wolffia columbiana
Trillium cernuum, var. *macranthum*
Trillium undulatum
Cypripedium parviflorum, and var. *pubescens*
Cypripedium reginae
Habenaria clavellata
Habenaria dilatata
Calopogon pulchellus
Arethusa bulbosa
Spiranthes Romanzoffiana
Epipactis repens, var. *ophioides*
Microstylis monophyllos
Microstylis unifolia
Salix serissima
Salix pedicellata, var. *hypoglauca*
Chenopodium capitatum
Arenaria lateriflora
Stellaria borealis
Ranunculus longirostris
Cardamine pratensis, var. *palustris*
Mitella nuda
Parnassia caroliniana
Ribes lacustre
Ribes triste, var. *albinervium*
Spiraea latifolia
Sorbus americana

Amelanchier intermedia
Potentilla Anserina
Potentilla fruticosa
Rubus jacens
Floerkea proserpinacoides
Rhamnus alnifolia
Viola Selkirkii
Ledum groenlandicum
Andromeda glaucophylla
Chamaedaphne calyculata
Chiogenes hispidula
Vaccinium canadense
Vaccinium macrocarpon
Vaccinium Oxycoccus
Bartonia virginica
Menyanthes trifoliata
Veronica Anagallis-aquatica, var. *latifolia*
Galium labradoricum
Galium trifidum
Lonicera hirsuta
Viburnum Opulus, var. *americanum*
Lobelia spicata
Aster junceus
Bidens discoidea

GENERAL STATISTICS OF THE CATALOG, AND COMPARISON WITH DUDLEY'S FLORA

No attempt is here made to compare the number of plants treated in this catalog with those listed in catalogs of other regions, for in each case the number depends as much upon the thoroughness of exploration and the segregation of species as upon the actual richness of the flora. A few statistics in reference to the present work, however, as compared with Dudley's *Flora*, are of interest.[49]

	Dudley[50]	Wiegand and Eames
Number of families included	106	125
Number of genera	463	553
Number of species and varieties	1,267	1,637

Dudley's list did not include the vascular cryptogams, of which there are now listed 60 species and varieties. The present flora is, then, larger than Dudley's list, in number of seed plants, by 310 species and varieties. The following tables present this comparison somewhat in detail.

Pteridophyta

	Dudley	Wiegand and Eames	Increase	Per cent increase
Species:				
Native	0	56	....	....
Introduced	0	1	....	....
Total	0	57	....	....
Varieties	0	3	....	....

[49] Where a species is represented in this flora by a variety only, such a variety is counted as a species, not as a variety, in the following tables. Species and varieties in brackets are not counted.
[50] To facilitate comparison, the number from Dudley excludes the hybrids and forms to which a number was given by him, and includes plants designated by him with an already-used number plus a distinguishing letter.

Gymnospermae

	Dudley	Wiegand and Eames	Increase	Per cent increase
Species:				
Native	11	11	0	0
Introduced	0	0	0	0
Total	11	11	0	0
Varieties	0	0	0	0

Monocotyledons

	Dudley	Wiegand and Eames	Increase or decrease	Per cent increase or decrease
Species:				
Native	318	386	68	21
Introduced	21	56	35	167
Total	339	442	103	30
Varieties	61	41	-20	-33

Choripetalae

	Dudley	Wiegand and Eames	Increase	Per cent increase
Species:				
Native	367	419	52	14
Introduced	110	188	78	71
Total	477	607	130	27
Varieties	28	43	15	54

Gamopetalae

	Dudley	Wiegand and Eames	Increase	Per cent increase
Species:				
Native	256	274	18	7
Introduced	71	119	48	68
Total	327	393	66	20
Varieties	24	40	16	67

Total, excluding Pteridophyta

	Dudley	Wiegand and Eames	Increase	Per cent increase
Species:				
Native	952	1,090	138	14
Introduced	202	363	161	80
Total	1,154	1,453	299	26
Varieties	113	124	11	10

Grand total, Wiegand and Eames:	
Species:	
Native	1,146
Introduced	364
Total	1,510
Varieties	127

COMPARISON OF NUMBERS OF SPECIES IN THE LARGER FAMILIES, AS GIVEN IN THE TWO FLORAS

	Species		Species plus varieties	
	Dudley	Wiegand and Eames	Dudley	Wiegand and Eames
Cyperaceae	119	157	149	175
Compositae	113	145	125	166
Gramineae	92	136	107	148
Rosaceae	57	98	69	106
Leguminosae	42	50	43	52
Cruciferae	31	43	34	46
Labiatae	30	38	33	42
Orchidaceae	35	38	35	39
Ranunculaceae	36	36	38	39
Scrophulariaceae	29	33	29	35
Ericaceae	30	31	35	33
Polypodiaceae	0	29	0	31
Liliaceae (inclusive)	29	29	29	29
Najadaceae	25	27	33	30
Polygonaceae	26	27	27	29
Caryophyllaceae	16	27	16	27
Umbelliferae	22	25	24	26
Salicaceae	21	24	23	29
Violaceae	13	22	15	25
Caprifoliaceae	20	21	21	24
Juncaceae	12	19	17	21
Saxifragaceae	15	18	16	18
Rubiaceae	11	18	13	18
Urticaceae	14	17	14	18
Boraginaceae	15	17	15	17

The genera containing ten or more species found in the basin are 21 in number. They are listed below, first in order of number of species and then in order of relationship.

	Species	Species plus varieties		Species	Species plus varieties
Carex	111	125	Ranunculus	15	17
Potamogeton	23	24	Galium	14	14
Viola	21	24	Prunus	12	13
Panicum	19	23	Rubus	12	13
Polygonum	19	21	Habenaria	12	12
Crataegus	19	19	Poa	11	11
Aster	18	18	Veronica	10	12
Salix	17	22	Bromus	10	10
Solidago	17	22	Ribes	10	10
Scirpus	17	20	Chenopodium	10	10
Juncus	17	19			

Monocotyledons		Choripetalae		Gamopetalae	
Genus	Number of species	Genus	Number of species	Genus	Number of species
Potamogeton	23	Salix	17	Veronica	10
Poa	11	Polygonum	19	Galium	14
Bromus	10	Chenopodium	10	Solidago	17
Panicum	19	Ranunculus	15	Aster	18
Scirpus	17	Ribes	10		
Carex	111	Prunus	12		
Juncus	17	Rubus	12		
Habenaria	12	Crataegus	19		
		Viola	21		

The increase in the flora is due to several causes. The segregation of species and varieties, which in the past thirty-nine years has been rather extensive in genera of the northeastern United States — for example, in such genera as Glyceria, Panicum, Carex, Crataegus, Galium, Antennaria, and Bidens — will account for about 54 per cent of this increase. Weeds that have reached the basin and have become established during this period add a rather large number of new species. Plants that have escaped from cultivation within the region, have become established, and are now behaving as weeds, are numerous. There is evidence that a few plants native to the general region but probably absent from the flora in Dudley's time have since that time migrated into the basin. Some native plants apparently overlooked by

Dudley have subsequently been discovered and added to the flora, but these have been remarkably few. The present list is further increased by certain varieties and species recognized by Dudley but not given names or numbers in his list. Varieties in Dudley's *Flora* which were based on color differences alone, have been reduced to forms and are not enumerated in the present list. A few of the species of Dudley's *Flora* have also been omitted in the present list, for reasons discussed elsewhere. The following synopsis gives an analysis of the increase in the present flora. The numbers given include both species and varieties. Lists and discussions of some of these groups of plants follow the synopsis.[51]

Segregates recognized since Dudley's time	177
Plants listed by Dudley, but with no number; now recognized and numbered	23
Plants new to the flora:	
Overlooked by Dudley	33
Recently introduced:	
Native in surrounding region	9
Foreign or from other parts of the United States, including escaped cultivated plants	128
Vascular cryptogams	60
Total new plants added	430
Less numbered species and varieties dropped from Dudley's *Flora*	60
Difference in number between Dudley's *Flora* and the present one	370

NEW AND APPARENTLY ESTABLISHED WEEDS

The weed flora has increased greatly during the past thirty-nine years. Plants already established have become more numerous and have spread throughout the basin; also, many new weeds have come in, and the persistence and increase of these has been watched and recorded. The dates of advent of some of the newer plants (based on the first collection known to the authors) are given in the data covering the distribution of each species. These dates probably show the approximate period of introduction.

During the past ten years, certain species have been noticed to become more abundant and to spread over large areas of new territory. The following are examples: *Hieracium pratense*, known a few years ago only in the extreme southern part of the basin, has migrated rapidly northward and is now frequent throughout the southern section. *Epilobium hirsutum* is cited by Dudley as having been reported from Ithaca in 1874, but it was not known to him and probably has become established here since 1886; it is now abundant at the northern end of Cayuga Lake and in recent years has spread southward, having reached Summit Marsh at the extreme southern limit of the basin. *Penstemon laevigatus*, var. *Digitalis*, has in the past few years become a common weed of moist pasture lands in the southern, eastern, and central parts of the basin. *Carex contigua* is becoming a frequent roadside and lawn weed about Ithaca and Union Springs. *Solanum carolinense* is becoming frequent in fields throughout the region. *Cuphea petiolata* has spread, in a very few years, from a small roadside patch over acres of clayey hayfields. *Serapias Helleborine* may be called a weed orchid; it appears to be spreading rapidly in rich, sheltered woodlands, and a large patch has been found flourishing along a roadside, very weed-like in appearance and in habitat.

[51] The lists of species and varieties which follow this synopsis do not always represent the groups segregated in the synopsis. They have been compiled on somewhat different bases.

A few weeds which were rare in Dudley's time are now common. In 1885 *Hieracium aurantiacum* was known from only three stations, and *Lactuca scariola*, var. *integrata*, and *Potentilla recta* from only one. All of these are now abundant. Very few of the weeds known to Dudley have become extinct, though a considerable number appear to have increased little or not at all. For example, *Senecio vulgaris* and *Hibiscus Trionum* are found now only in the same general regions as was the case many years ago. *Aristolochia Clematitis* has not established new stations, though the area of the original station has apparently been considerably increased. A weed as flourishing and as dominant where once established in low grounds as *Succisa australis*, has in the seventy-five years since its introduction spread over only a few square miles, though it has recently been found near Montezuma village and at Auburn, respectively 12 and 9 miles away.

Included in the following list are not only adventive foreign plants and those escaped from cultivation, but also certain native plants, such as *Pycnanthemum flexuosum*, which have entered the flora and are behaving as weeds.

Bromus brizaeformis
Bromus tectorum
Festuca rubra
Puccinellia distans
Puccinellia distans, var. *tenuis*
Eragrostis Frankii
Eragrostis pilosa
Eragrostis peregrina
Eragrostis minor
Lolium temulentum
Lolium perenne, var. *orgyiale*
Lolium multiflorum
Lolium multiflorum, var. *diminutum*
Arrhenatherum elatius
Eleusine indica
Paspalum ciliatifolium (*P. Muhlenbergii*)
Panicum Gattingeri
Setaria italica
Cenchrus pauciflorus
Stenophyllus capillaris
Carex contigua
Juncus compressus
Juncus inflexus
Serapias Helleborine
Rumex mexicanus
Polygonum ramosissimum
Chenopodium ambrosioides
Chenopodium Bonus-Henricus
Chenopodium glaucum
Salicornia europaea
Salsola Kali, var. *tenuifolia*
Sagina procumbens
Silene dichotoma
Silene latifolia
Saponaria Vaccaria
Gypsophila muralis
Berteroa incana
Thlaspi arvense
Brassica juncea
Erucastrum gallicum
Conringia orientalis
Sisymbrium altissimum
Sisymbrium Thalianum
Erysimum repandum
Roripa sylvestris
Barbarea verna
Reseda lutea
Duchesnea indica
Potentilla recta, var. *obscura*
Trifolium arvense
Trifolium fragiferum
Trifolium dubium
Vicia tetrasperma
Vicia villosa
Geranium molle
Erodium cicutarium
Euphorbia corollata
Euphorbia Helioscopia
Euphorbia lucida
Viola arvensis
Cuphea petiolata
Epilobium hirsutum
Cynanchum Vincetoxicum
Convolvulus japonicus
Symphytum asperum
Echium vulgare
Verbena stricta
Lamium purpureum
Pycnanthemum flexuosum
Solanum carolinense
Physalis pruinosa
Physalis subglabrata
Linaria minor
Linaria Cymbalaria
Penstemon laevigatus, var. *Digitalis*
Veronica agrestis
Plantago aristata

Galium verum
Galium Mollugo
Sherardia arvensis
Knautia arvensis
Grindelia squarrosa
Rudbeckia triloba
Galinsoga ciliata
Chrysanthemum Leucanthemum (true)
Artemisia biennis
Artemisia Abrotanum
Artemisia serrata
Carduus nutans
Onopordum Acanthium
Centaurea Jacea
Centaurea Jacea, var. *pratensis*
Centaurea Jacea, var. *nigra*
Centaurea maculosa
Lapsana communis
Hypochaeris radicata
Apargia autumnale
Picris hieracioides
Chondrilla juncea
Lactuca scariola (true)
Crepis capillaris
Hieracium Pilosella
Hieracium pratense
Hieracium florentinum

RECENTLY ESCAPED CULTIVATED PLANTS

The following cultivated plants are occasionally found growing wild, and in a few cases are apparently established.

Ornithogalum umbellatum
Betula pendula
Alnus vulgaris
Maclura pomifera
Humulus japonicus
Chenopodium Bonus-Henricus
Lychnis coronaria
Lychnis chalcedonica
Nelumbo lutea
Ribes odoratum
Ribes nigrum
Filipendula Ulmaria
Rubus laciniatus
Rosa gallica
Rosa canina
Prunus Mahaleb
Lathyrus latifolius
Acer platanoides
Hedera Helix
Imperatoria Ostruthium
Fraxinus excelsior
Syringa vulgaris
Convolvulus japonicus
Physostegia virginiana
Mentha gentilis
Linaria Cymbalaria
Lonicera japonica
Artemisia Abrotanum

NATIVE PLANTS, NOT SEGREGATES, ADDED SINCE THE PUBLICATION OF DUDLEY'S FLORA, EITHER OVERLOOKED BY DUDLEY OR HAVING ENTERED THE BASIN FROM THE SURROUNDING REGION IN RECENT YEARS

Sparganium minimum
Ruppia maritima, var. *longipes*
Triglochin maritima
Calamagrostis hyperborea
Cyperus erythrorhizos
Eleocharis quadrangulata
Eleocharis olivacea
Fimbristylis autumnalis
Scirpus nanus
Scleria pauciflora, var. *caroliniana*
Carex aestivalis
Carex Muhlenbergii, var. *enervis*
Carex longirostris
Carex Crawfordii
Carex Schweinitzii
Juncus dichotomus, var. *platyphyllus*
Juncus Torreyi
Juncus brevicaudatus
Listera australis
Corallorrhiza odontorhiza
Microstylis unifolia
Betula papyrifera
Arceuthobium pusillum
Spergularia alata
Armoracia aquatica
Spiraea latifolia
Spiraea tomentosa
Polygala sanguinea
Evonymus atropurpureus
Lythrum alatum

Oenothera pratensis
Circaea canadensis
Convolvulus sepium, var. *pubescens*
Stachys palustris
Monarda punctata
Pycnanthemum flexuosum
Utricularia gibba
Galium palustre
Lobelia spicata
Rudbeckia speciosa
Bidens laevis
Lactuca hirsuta

PLANTS LISTED BY DUDLEY OR REPORTED FROM THE CAYUGA LAKE BASIN BEFORE 1886, NOT FOUND IN RECENT YEARS

Potamogeton rufescens (*P. alpinus*)
Potamogeton Hillii
Carex decomposita
Carex chordorrhiza
Nuphar pumilum (*Nymphozanthus microphyllus*)
Dicentra eximia
Sisymbrium canescens (*S. brachycarpon*)
Ribes lacustre
Lathyrus venosus
Rhexia virginica
Myriophyllum heterophyllum
Myriophyllum verticillatum (*M. v.*, var. *pectinatum*)
Hippuris vulgaris
Chaerophyllum procumbens
Chimaphila maculata
Moneses uniflora
Cuscuta Epilinum
Cuscuta inflexa (*C. Coryli*)
Castilleja coccinea
Plantago cordata
Coreopsis trichosperma (*Bidens trichosperma*)
Petasites palmatus

PLANTS IN DUDLEY'S LIST THAT HAVE BEEN DROPPED FROM THE PRESENT LIST

The following species and varieties included in Dudley's *Flora* have been dropped in this work because of established error or probable hybrid nature, because they are based on very doubtful material, or because they have been reduced to unnumbered forms; also, in the case of a few escapes, because they have not become established. These are discussed under the respective species. Unnamed, but numbered, varieties that have been dropped are not here listed.

Potamogeton natans, var. *prolixus*
Potamogeton pusillus, var. *tenuissimus*
Sagittaria heterophylla, var. *elliptica*
Trisetum palustre (*Sphenopholis pennsylvanica*)
Alopecurus geniculatus (true)
Eriophorum virginicum, var. *album*
Carex straminea, var. *festucacea*
Carex angustata, var. *strictior*
Carex angustata, var. *xerocarpa*
Carex Emmonsii, var. *elliptica*
Carex ampullacea, var. *sparsiflora*
Juncus acuminatus, var. *debilis* (*J. debilis*)
Juncus effusus, var. *conglomeratus* (probably *J. effusus*, var. *compactus*)
Lilium superbum
Quercus prinoides
Rumex conglomeratus
Polygonum Hartwrightii
Polygonum dumetorum (true)
Anemone nemorosa (true)
Anemone virginiana, var. *alba*
Nymphaea odorata, var. *minor*
Lepidium ruderale
Dentaria maxima
Rubus neglectus
Rosa lucida (*R. virginiana*)
Robinia viscosa
Desmodium rigidum
Lespedeza Stuvei
Hypericum canadense (true)
Oenothera biennis, var. *grandiflora*
Thaspium aureum
Kalmia angustifolia
Pyrola secunda, var. *pumila*
Vaccinium pennsylvanicum, var. *nigrum*
Vaccinium corymbosum, var. *atrococcum*
Gentiana Saponaria

Asclepias incarnata, var. *pulchra*
Collinsia verna
Mentha piperita, var. *subhirsuta*
Monarda fistulosa, var. *rubra*
Catalpa bignonioides
Aster vimineus
Aster novi-belgii
Aster novae-angliae, var. *roseus*
Aster diffusus, var. *thyrsoideus* (*A lateriflorus*, var.)
Aster diffusus, var. *hirsuticaulis* (*A. lateriflorus*, var.)
Xanthium canadense, var. *echinatum* (*X. orientale*, var.)
Cnicus (*Cirsium*) *arvensis*, var. *albiflorus*
Hieracium Gronovii

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Latin names of families are in SMALL CAPITALS. Synonyms are in *italics*. Names of plants mentioned in the appendix are not included in the index.

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